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MIDWIFERY ILLUSTRATED,

BY

J. P. MAYGRIER, M. D.,

PROFESSOR OF OBSTETRICS AND DISEASES OF WOMEN AND CHILDREN, AT PARIS, AND MEMBER OF SEVERAL SCIENTIFIC SOCIETIES.

TRANSLATED FROM THE FRENCH, WITH NOTES,

BY

A. SIDNEY DOANE, A. M., M. D.

WITH EIGHTY PLATES.

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A. SIDNEY DOANE,
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TO

JOHN W. FRANCIS, M. D.,

Late Professor of Obstetrics and Forensic Medicine in Rutgers Medical Faculty, Geneva College, New York; Member of the Medical and Chirurgical Society of London; of the Wernerian Natural History Society of Edinburgh; of the Academy of Natural Sciences of Philadelphia; of the Lyceum of Natural History of New York; of the Literary and Philosophical Society of New York; &c., &c., &c.

Dear Sir,

Accept the dedication of this work as a tribute of respect for your profound attainments in the Science of Medicine, and particularly in Obstetrics, and for your exertions in the cause of Medical Literature. That you may long continue in your present career of usefulness, and that each day may add to your fame, is the sincere wish of,

Yours, very truly,

A. SIDNEY DOANE.

April 2d.

TRANSLATOR'S PREFACE.

In presenting to the public an American edition of Maygrier's "*Nouvelles Démonstrations d'Accouchemens*," we do not profess to give a complete work on Obstetrics; we doubt whether this be needed, as we already possess the treatise of Denman with Professor Francis' valuable additions and notes, those of Dewees, Burns, Velpeau, and others; our object has been, to put within the reach of every student and practitioner of medicine, a book which is unique, and allowed by all to be extremely valuable.

Circumstances beyond our control have prevented those alterations in the plates demanded by the differences between the American and French customs, such as the position of the female during labor, &c.; but these will be seen instantly.

No expense has been spared to render these lithographic plates superior to any ever published in this country; we offer them with confidence, and challenge a comparison even with the French originals. A few errors have occurred in their lettering; the most important is upon plate L., where

for "*delivery of the feet in one position of the head,*" read, "*in the first position of the head.*" These, however, will be corrected hereafter.

We now commit the work to the public, hoping and trusting that its reception may be such as to repay, in a measure, the labor and money expended upon it.

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ORIGINAL PREFACE.

It must be admitted, that the study of Obstetrics has not progressed much in France during the last fifty years, as is incontestably proved by every work published on the subject, during this period. However carefully authors may have endeavored to point out correctly the most remarkable, and the most minute particulars relating to Obstetrics, whatever attention may have been given to describing the anatomical parts of the female and of the child, and also to demonstrating the manual of all difficult labors, many subjects still remain, on which our ideas are as yet very imperfect. A practical knowledge is not gained from books; but it is by attending females in labor, and during pregnancy, that the medical man acquires that quickness and that experience which alone can render him able, and without which he will always be an unskillful practitioner, if not a dangerous operator.

Having taught Obstetrics for many years, I have more than once been astonished at the difficulty of explaining to the pupils, who attended my course of lectures, certain demonstrations for which language was inadequate. Struck with this inconvenience, I formed the plan of a work, in which I proposed to represent by drawings what seemed impossible to be taught without this powerful means of addressing the eye, and in that manner, of replacing those opportunities so often required by young physicians in the practical study of Obstetrics.

Several attempts were made, but they were unsatisfactory, notwithstanding every exertion on my part. The artists whom I consulted at

this period, did not understand me; those whom I employed executed the work intrusted to them very badly; and I was on the point of abandoning the attempt, when a happy concurrence of favorable circumstances, inspired me with new courage, and I saw the possibility of attaining the end proposed. The success of the undertaking hitherto has exceeded my expectations;—while I am writing, the work, published by subscription, entitled "*Nouvelles Demonstrations d'Accouchemens*," five parts of which have appeared, progresses rapidly. It has not only been favorably received, but several distinguished physicians have kindly bestowed upon me, in the journals, such delicate commendation as I appreciate, and which I shall endeavor to merit more and more, by the great care I shall devote to my undertaking.*

The plan of my work is vast, and totally different from all those which have hitherto appeared on the same subject. The idea of it is entirely new, at least in its execution. In this work, in fact, every thing in Obstetrics, which can be seen or touched, will be faithfully represented by engravings, in which the most scrupulous exactness will contrast with a perfection hitherto unequalled in this style. It will be, properly speaking, a *pictured* or *graphic demonstration* of Obstetrics.

It is true that many works on Obstetrics with plates have been published; but a mere glance at the plates will show their deficiency in execution, and that they are insufficient for the practical study of Obstetrics. It cannot be denied then, that this branch of science has long needed a work professedly on this subject, in which the author should attempt to present, by drawings and engravings, the series of objects which compose the practical science of Obstetrics. I know not how far this difficult task will be accomplished; being the first person to form the plan, I may possibly fail in the end proposed. The successive and complete publication of the parts will alone decide this question.

I cannot conclude this preface without thanking the different persons who have kindly assisted me. And first, Prof. Breschet, *Chef des Travaux Anatomiques de la Faculté de Médicine*, who has placed at my disposal whatever might contribute to the success of my enterprise, and

* Since this preface was written, two new editions of this work have appeared; one, royal 8vo., published at Brussels; and a German translation by Siebold.

whose clear and intelligent advice has been very useful. The same remarks apply to Dr. Laniscard, who has executed very skillfully all the preparations I needed. My nephew, Dr. Ozenne, has also given proofs of zeal and discernment in forwarding all the details intrusted to him. Finally, I have thought it advantageous, and for the interest of the work, to take the advice of several distinguished artists who have glanced at my labors, and M. Desains, a pupil of David, has, among others, favored me with important advice. M. Chazal, draughtsman of the work, needs not my approbation; his pencil and brush, the faithful interpreters of his talent, speak volumes in his praise.

INTRODUCTION.

THE male and the female are formed apparently upon the same model, and differ, in the eyes of the multitude, only in their height and muscular power: it is commonly remarked, that the male is taller than the female; he is also the stronger. The knowledge of physiology generally possessed is confined to this point; the enlightened observer, without dwelling on these superficial differences, will look further; the profound study of this important subject, which he must necessarily make, opens to him the means of discovering numerous shades and modifications imperceptible at the first glance. Man must doubtless be stronger than woman, and also taller; he, in fact, must watch over the safety and preservation of his family; he must provide for the wants of his wife and children. But whatever may be the idea of beauty attached to height, this height is of no value, unless all other parts of the organization perfectly accord with it; for independent of the fact that the tallest men are not always the most intellectual, this height, when very

great, so far from being an advantage, is on the contrary injurious: in fact, we observe that very tall individuals are usually thin and feeble, and are also incapable of traveling long distances, and of enduring excessive fatigue. It is by regarding the admirable models of the ancients, that we can gain a knowledge of the true lineaments of manly beauty: by looking at the finest statues of antiquity, we obtain the most correct, and at the same time the most noble idea of the happy proportions in which the Grecian statuaries imagined the real beauty of the body to consist.

Man then, possessing all the energy of his physical powers, and the full vigor of an enlightened reason, is the central point, and as it were the base on which the strength and the fate of the social edifice depend. It is not when man is emerging from infancy, when his gait is unsteady and he with difficulty lisps a few words, when he requires every assistance, that he can be left to himself, and be governed by his own powers: it is not in youth, at that truly brilliant period of his life, that he can take the station which belongs to him in the order of nature, and particularly in the social state: feeble, inconstant, easily seduced, and more easily betrayed, man, at this age, is assailed by desires of every kind; he seeks pleasure in every form, and is ignorant of his rights and powers; a prey to his passions, his reason is not yet mature enough to conquer them, nor does his intellect possess the talents necessary to fulfill completely the duties imposed by his station. It is only when between thirty and forty years of age, that he is truly a man: study

the legislative proceedings of all nations, pursue the history of their progress in the arts and sciences, in their wars, and even in the eloquence of their tribunals, you will see that the public offices have been intrusted to men of this age; you will find that the works of genius, and the most valuable discoveries of industry, are always the fruits of mature life. Some rare exceptions, it is true, would seem to invalidate the truth of the propositions we have advanced; but these exceptions, on the contrary, confirm the rule; for we are constantly telling that these privileged men, in whom the intellectual faculties are as it were prematurely developed, possess extraordinary talent; that they are exceptions to the common rule: all the details and all the traits of their infancy are eagerly sought after, to deduce from them this consequence: that nature has favored their formation, that she has varied from her common course, and has concentred in one individual a mass of intelligence generally possessed by several.

Man then is not truly worthy of the name, until he has arrived at maturity, and can command others, as he commands himself. Master of his passions, he has at this period of his life all the physical and all the moral power necessary for performing the most arduous undertakings; he possesses mind enough for forming the most extensive plans, and those which will conduce most to the happiness of his fellow beings. To meditate, to conceive, and to execute: such are the means, such are his faculties.

In this rapid glance at the rights and powers of man, we have not considered him in his relations with the Deity. This object is of great importance, as it decides his future destiny, and requires a plan much more vast than that which we have adopted. In the precepts of the Holy Evangelists, in the books of the Sacred Scriptures, he finds a rule of conduct, and an enlightened guide for his actions. It is sufficient to mention in this place, his rank in the order of nature, or in the social state, or in that of civilization.

Let us now see how nearly the female resembles the male, or rather to what extent they differ: let us inquire by what admirable mechanism the Creator has formed two beings so similar in appearance, but who are in fact so different, and has given them tastes, inclinations and characters, which are, as it were, constantly in contrast and opposition: we shall see that the attraction which draws them to each other, although called into action by the same desire, does not rest on the same sentiment; hence it will not be difficult to adduce the prominent traits which distinguish the female from the male, and to demonstrate the great dissimilarity between the male and the female; and that the latter is not only female in the peculiar disposition and arrangement of her genital organs, and in the essential differences which distinguish them from those of the male, but in all parts of the individual; and that she differs from the male, not only in the form and structure of her skeleton, but that the muscular, the circulatory, the nervous, the glandular and the cellular systems, the secretions and excre-

tions of every kind, present in this respect the most perfect contrast, the most formal opposition. In order to be convinced of this truth, we need not wait until the female has arrived at the age of womanhood. Observe her from early infancy; hardly can she pronounce a few words, and conceive a few ideas, than her manners are all feminine: follow her among male children of her age; observe her timidity, her reserve and embarrassment; when on the contrary, the little boys around her are bold and loud in their plays: at a later period, and even when the forms of both sexes are more developed, every one can distinguish by her gait, features, and even her voice, a young girl ten or twelve years old from a boy of the same age. If you consult their reciprocal tastes, how many shades and modifications are apparent. Look at the cunning of Ulysses; when he wished to discover Achilles, who was concealed among the daughters of Lycomedes, he placed arms among the jewels which were displayed to their eyes, to flatter their tastes, or to satisfy their curiosity!

We shall not extend these remarks any further; and we should fail in the end proposed, if we pause to trace a more or less fascinating picture of the forms, graces, and attractions of every kind, which nature has bestowed upon females, and make this the sole object of our researches. Convinced that the secret end of all these advantages is the fulfillment of the well marked designs of nature, for the propagation of the species, we must not be astonished, if in order to accomplish this, she has bestowed upon her all the

power, all the magic of her seducing charms: when pregnancy exists, every wish is consummated; satisfied with her work, nature immediately robs woman of her charms, and of that attraction which brings man towards her. An inward sentiment, a secret voice seems to say, "Respect her; for she bears in her bosom the fruit of a love which another has shared, and with which you cannot inspire her." Beauty in females is not the end, but the means; and without any disrespect, it must be admitted, that all women cannot please by the same kind of beauty; and that in this respect, tastes are as various as they are inexplicable. Beauty, in its strictest sense, would then be only a vain name, a kind of deception of our senses, a mode, a manner of being, the excellence of which may be extolled, and its merit exalted. But this beauty which is sought for so ardently, and which is so vividly desired, would be of but slight advantage to those females who are so jealous of it, if we could only figure to ourselves that in such a woman certain circumstances existed, which would render the act of generation physically impossible; such as a defect in her formation, or diseases calculated to produce well-grounded fears, or insurmountable disgust.

Let us not attempt to deceive ourselves! In paying sincere homage to the female whom nature has loaded with her gifts, let us not despise those to whom she seems to have refused them. Both are equally precious in her eyes, and she is displeased with those only who are unfit to fulfill the act of generation, or who cannot perform the duties of a

mother. This last remark naturally leads us to a sketch of the duties imposed by nature on the female destined to become a mother. When we speak of maternal duties, we do not pretend to say how much it costs a mother to bestow upon her offspring the care required by its feebleness, and by its incapability of providing itself with the necessaries of life.

Who, more than professional men, whose office it is to aid females in the most painful of their duties, can render them a juster tribute, and adduce more honorable examples of noble devotion, of which they daily give such touching proofs? No! there is nothing more noble, more worthy of true admiration than that imperious sentiment, at once so mild and tender, which unites the mother to her child, and which, as it were, makes but one existence of two individuals, so different in age, and apparently in necessities. Providence, always wise in ordering its designs, and attentive to the wants of mortals, has so connected the ties which unite the mother to the child, and has so identified them, that we do not exaggerate in saying, that the existence of the newly born child is as necessary to the mother who is to nurse it, as the latter is indispensable to her offspring. Maternal love then is the invisible link which binds all living beings to their natal soil; a sentiment which nothing can destroy, and which constantly provides for the preservation of the species. Without this, what would become of those nations whom so many causes sometimes concur to destroy and extirminate from the face of the globe?

Civil and foreign wars, and scourges of every kind, which often threaten to involve a nation in total ruin, would soon have swept off the last individual, if maternal love, stronger even than the causes which can extinguish it, had not surmounted every obstacle, had not braved every danger, to preserve tender and timid infancy from a death which is often inevitable. Man, intrusted with the great interests of society, is too often assailed by the desires of an insatiable ambition; he seeks wars and contests, and confronts death in pursuit of a vain glory, which is very frequently thwarted by this fury of a horrible vengeance: man, therefore, is unfitted for the cares demanded by early infancy, is insensible to its cries, and would soon abandon it to its pressing wants. Thus neglected, children would perish, and with them the whole human race would be extinct, did not woman take an active and continual care of them, did she not consecrate to them every moment, did she not sacrifice to them her whole life. Health, youth, beauty, happiness, the enjoyments of life, woman sacrifices every thing to her offspring.

> O cendres d'un epoux, ô Troyens, ô mon père,
> O mon fils, que tes jours coûtent chers à ta mère!
>
> ANDROMAQUE.

This feeling, however, which is so vivid and so imperious that we are obliged to call it sublime in females, does not belong to the human race alone; it appears as energetically and as strongly in animals, who may be said, in cer-

tain cases, to display resources which strike with astonishment and admiration even the most indifferent persons. The females of wild animals are usually less ferocious than the males, but become much more furious when their young are born, and during the whole period of lactation. How plaintive the cries, and how touching the moans of the female birds, when a cruel hand has stolen the nest which contained their young offspring!

Qualis populeâ mœrens Philomela. - - - - - -
- - - - - - - - - - - - - - - - - - -
- - - - - Et moestis latè loca questibus implet.

VIRGIL.

Numerous facts in regard to maternal love in the human species might be mentioned; we, however, shall confine ourselves to the following. In one of the last actions of the exterminating war waged by the Turks against the Christians in the East, the inhabitants of a village, yielding to numbers, but not destitute of courage, took the generous resolution of burying themselves under the ruins of their habitations, and of terminating the contest only with life; fearful of seeing their wives and children fall into the hands of their cruel enemies, they entertained, in their despair, the frightful thought of destroying them all, and of perishing themselves afterward, involving the Turks in their ruin. Their wives were apprised of this horrible plan, and by a supernatural effort forgot their own danger, to think only of their children. They instantly took a resolution which

must have sprung from an excess of maternal love: they demanded arms, stood at the side of their husbands, and all, animated by a warlike spirit worthy of so good a cause, prostrated their barbarous enemies in the dust.

> Sa mère . . . Ah! que l'amour inspire de courage!
> Quels transports animaient ses efforts et ses pas!
> Sa mère! . . . elle s'élance au milieu des soldats:
> "C'est mon fils! arrêtez! cessez, troupe inhumaine!
> C'est mon fils! déchirez sa mère et votre reine,
> Ce sein que l'a nourri, ces flancs que l'ont porté."
>
> MEROPE.

Numerous traits which I could adduce, would all prove this incontestable fact, that woman, destined by her peculiar nature to bear within herself the elements of a new being, and thus to contribute to the reproduction of the species, can have no greater happiness than that of devoting all her time to the preservation of her offspring, so weak, and apparently so delicate. But so far from complaining of the state of feebleness of early infancy, we must, on the contrary, admire the wisdom of Providence, which has made this obligation imposed on woman, the powerful bond which unites the whole chain of beings, and thus causes a succession of generations, while the invariable order is uninterrupted; and, as one of the greatest writers of the past age has observed, "If man was born tall and strong, his height and force would be useless until he had learned to use them: they would be injurious, by preventing others from assisting him; and, left to himself, he would die of

wretchedness before knowing his wants. We complain of the state of infancy: we do not see that man would have perished, if he had not been born a child."

Of all the maternal duties, there is no one more sacred than that which imposes on mothers the obligation of nursing their children. Here every thing concurs to accomplish the design of nature: not to mention the inward sentiment, so mild, and at the same time so imperious, which acquaints the mother with the cares due to her child, with that involuntary claim which in spite of her, obliges her to turn her tender regards towards the little creature which nestles in her bosom, the changes of every kind in her organization demonstrate its imperative necessity. What in fact, can be more admirable than the invariable order in which the new functions are performed, by the aid of which, the mother, satisfied of the existence of her child, may without effort, present it with nourishment as abundant as it is salutary? What is more ingenious, and at the same time more simple, than the flow of milk. At the first cry of the child, at the slightest touch of the lips, at the least caress, the mother is agitated: a slight shiver, which seems to begin at the feet, passes with the rapidity of lightning over the whole body, and stopping at the bosom, produces upon it the most lively impression. At that moment, the parts are evidently swelled, and a slight tension is perceived there: the mammæ are soon filled with an abundant secretion of milk, and if the mother

does not immediately give the breast to her child, the milk, impatient of remaining in the canals, jets forth, and nothing can arrest its course.

We ought not, in this place, to omit mentioning, that however sacred may be the obligation of nursing her child, however imperious may be the laws of nature on this subject, we are often obliged to bend before other laws which are no less commanding. All females do not live in fields: customs, manners, and the mode of living in great cities, are so many obstacles which very often oblige females to employ wet nurses, when it would be pleasant for them to fulfill the duties of mothers. It is in vain that Aulagelle among the ancients, that Buffon and Rousseau among the moderns, have spoken of these duties with all the warmth of the most persuasive eloquence; in vain have they extolled the sweets, the transports, of maternal love; in vain have they cursed those women who freed themselves from the obligation of nursing their children; necessity, stronger than the eloquence of these great authors, has made every thing bend to its law. Not to mention in this place those females whose numerous occupations prevent them from discharging the maternal duties, how many circumstances, such as locality, convenience, health, or even character and vicious inclinations, may prevent a mother from nursing her child. A prudent and enlightened physician should then request that the charge of nursing may devolve on another when he thinks that this duty may be attended with inconvenience or danger.

To medicine alone belongs the incontestable right of directing females in the exercise of this most important function: to that alone belongs the honor of marking out, in this respect, the conduct they must follow, and the precautions they must take. Ye tender wives, ye sensible and courageous mothers, whatever may be your charms, whatever may be the homage paid to you by flattering, perhaps by deceitful tongues, finally, whatever may be the vortex of pleasure in which you seek to dissipate the happiest periods of your life, believe in disinterested advice; maternal love can alone impart to you unclouded happiness, and remorseless pleasures! It is the powerful bond which intimately unites the wife to her husband; it is a source of delicious enjoyment to the mother; it sweetens the pains of life: finally, it is the true mode of preserving perfect health, and of guarding against the cruel sufferings and pains which often afflict those insensible to the voice of nature, or even those who for powerful reasons do not suckle the offspring bestowed on them by Heaven.

MIDWIFERY ILLUSTRATED.

OF THE FEMALE PELVIS,

CONSIDERED IN ITS RELATIONS WITH

THE PRACTICAL SCIENCE OF OBSTETRICS.

The pelvis considered generally, is only one division of the skeleton, the study of which belongs to that of osteology; but in its relations with parturition, the pelvis is a part of a series of organs, all which series concurs to accomplish the generative functions. We proceed to examine it in this last point of view: its study is very important; as this study alone can make known to us the real mechanism of parturition, and the greater or less difficulties which may sometimes render it complex.

In studying the pelvis, we must attend: 1st, to its description; 2d, to its general and special division, and to its dimensions; 3d, to its connections; 4th, to its anomalies, or to the deviations in its formation.

I. DESCRIPTION OF THE PELVIS.

The pelvis is a bony cavity, situated below the vertebral column, and above the lower or abdominal extremities: it is composed of four bones, viz. the sacrum, the coccyx, and the two iliac or coxal bones.

Sacrum. This bone is unmated, pyramidal, and triangular; it is flattened from before backward, and forms the posterior part of the pelvis. Its base is turned upward, and articulates with the last lumbar vertebra. Their union forms forward a remarkable prominence, termed the sacro-vertebral prominence or angle (the Promontory of Meckel). Its apex is turned downward and articulates with the coccyx.

Its anterior, internal or pelvic face is concave, and presents two ranges of foramina, through which pass the anterior branches of the sacral nerves; in the natural state, the rectum is situated on this face.

The external, posterior, or spinal face is convex, and presents several tubercles, to which tendinous, aponeurotic and ligamentous parts are attached. We also remark in it two ranges of foramina, through which the posterior branches of the sacral nerves emerge.

The two sides of the sacrum present above, at their upper part, an articular impression, exactly like that of the iliac portion of the corresponding coxal bone; at its lower part, the large and small sacro-sciatic ligaments are inserted.

Coccyx. This unmated bone is situated at the posterior part of the pelvis, below the sacrum, to which it is attached as an appendix. Its anterior and concave face looks to the inner side of the pelvis, and supports the end of the rectum;

its posterior and convex face is situated directly below the integuments, and presents nothing worthy of remark; its base is turned upward, and articulates with the sacrum; its apex is loose, and is enveloped by the surrounding soft parts.

The coccyx is formed of three distinct pieces, which are very movable on account of the peculiar arrangement of their articulation.

Iliac or coxal bones. These two irregular bones form the sides and the anterior part of the pelvis. Their external face, the femoral, presents above a broad surface, termed the gluteal region; below, there is a cavity for the head of the femur; still lower and forward is the obturator or oval foramen. The rest of this external face presents nothing remarkable.

The internal face, the abdominal, presents above a broad concave surface, termed the internal iliac fossa, on which the iliacus internus muscle is situated; below, a prominent line which proceeds obliquely from behind forward; still lower, the opening of the obturator or oval foramen; behind this foramen, a broad surface, which forms an inclined plane on which the head of the fetus glides during parturition.

The circumference commences above and forward by the anterior and superior spine of the ilium; following it backward, we find the crest of the same bone in the form of the letter S; farther backward, the great ischiatic notch; below, the ischiatic spine and the small ischiatic notch; entirely below, the tuberosity of the ischium; reascending forward, the ascending branch of the ischium and the descending branch of the pubis; above, the symphysis pubis, which is from eighteen to twenty lines high, and from six to eight broad; anteriorly, the spine of the pubis and its hori-

zontal branch, at which place we observe the ilio-pectineal eminence, and more posteriorly, a groove on which the united tendons of the psoas and iliacus muscles glide.

It is necessary in anatomy, and particularly in obstetrics, to divide the iliac or coxal bone into three parts; which are, the ilium above, the pubis below and forward, and the ischium below and backward. But the lines of demarkation are visible only in very young subjects; at a later period, all the parts of the bone are so blended that they cannot be distinguished. (*See Plate II. Figure* 3.)

II. DIVISION AND DIMENSIONS OF THE PELVIS.

Before passing to the general division of the female pelvis, we must point out the differences which distinguish it from that of the male, and those points in which they both differ from that of the fetus. By looking at the first two comparatively (*see Pl. II. Fig.* 1 *and* 2) it is easy to see that the pelvis of the female is lower and broader than that of the male, and that the arch of the pubis particularly, in the first, is much more open and rounded than in the second;*

* Professor Francis (*Francis' Denman, 3d edition, p.* 95,) has stated very lucidly, the distinctive marks of the male and female skeleton, which occur chiefly in the pelvis. He says, "The pelvis of the female is less strong, less thick, and contains less osseous matter than that of the male. In the female, the long diameter of the brim of the pelvis is from side to side; in the male it is from before backward; in the female, the brim is more of the oval shape, in the male more triangular: in the female the ilia are more distant; the tuberosities of the ischia are also more remote from each other, and from the os coccygis; and as these three points are further apart, the notches between them are consequently wider, and there is of necessity a considerably greater space between the os coccygis and pubes than in the male. The female sacrum is broader and less curved than in the other sex. The ligamentous cartilage at the symphysis pubis is broader and shorter. In consequence of the cavity of the pelvis being wider in women, the superior articulations of their thigh-bones are fur-

so likewise in comparing the pelvis of the two adults with that of the fetus, we see that this latter is remarkable for its great length, and also for its extent from before backward, which is much greater than from side to side, while the contrary is the case in the pelvis of an adult. The reason of this is that the sacrum is deficient: the different pieces of which it is afterwards to be composed have, at this early period, only the usual breadth of the other vertebræ.

The whole pelvis is divided into the large and small pelvis. The large is very flaring, and occupies all its upper part. It is formed posteriorly by the last two lumbar vertebræ, which must be left in place when we wish to preserve the pelvis for the study of obstetrics. We observe anteriorly, a great fissure, occupied in the recent state by the parietes of the abdomen, which being flexible and very elastic, yield with facility to the development of the uterus during gestation.

The sides of the large pelvis are formed by the iliac portions of the coxal bones. Above, it looks into the abdomen; below, it blends with the small pelvis, from which it is

ther removed from each other, which circumstance occasions their peculiarity in walking: they seem to require a greater effort than men to preserve the centre of gravity when the leg is raised. The greater distance between the anterior and superior spinous processes of the ilia necessarily increases the length of Poupart's ligament forming the crural arch; on which account less resistance being made to the abdominal viscera, females are more subject to femoral hernia than males. Soemmering has remarked, that the angle of union of the ossa pubis is in the male from 60 to 80 degrees, whereas in the female it is 90 degrees.

According to the most accurate calculations, the mean height of the male, at the period of maturity, appears to be about five feet eight and a half inches: that of the female seems to be about five feet five inches; and the length of the different regions proportionally less than in the male. A well-formed pelvis is generally allowed to have a circumference equal to one-fourth of the height of the female."

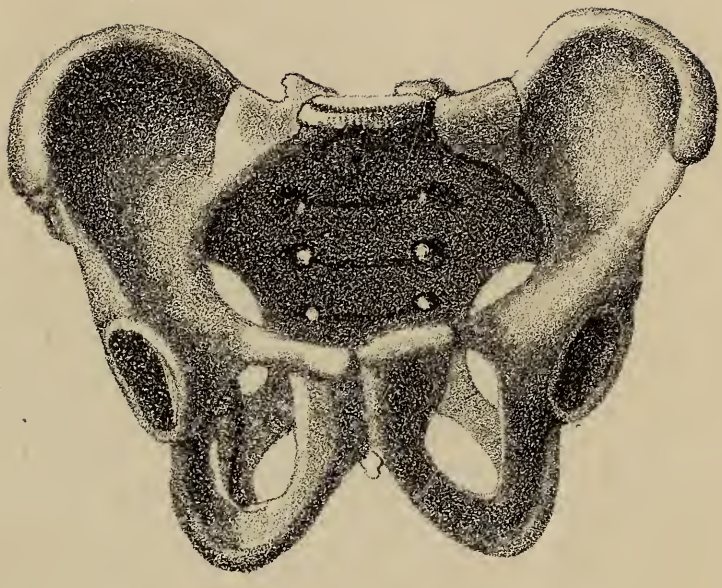
separated only by the slightly contracted opening, termed the superior or abdominal strait.

The small pelvis, or the pelvis properly so called, is only that kind of canal through which the fetus passes, with greater or less pain, during parturition. It is narrow at its entrance and its termination, and the intermediate space presents a kind of cavity, the cavity of the pelvis, in which the head of the child, while passing, performs certain very remarkable motions, which we shall mention hereafter.

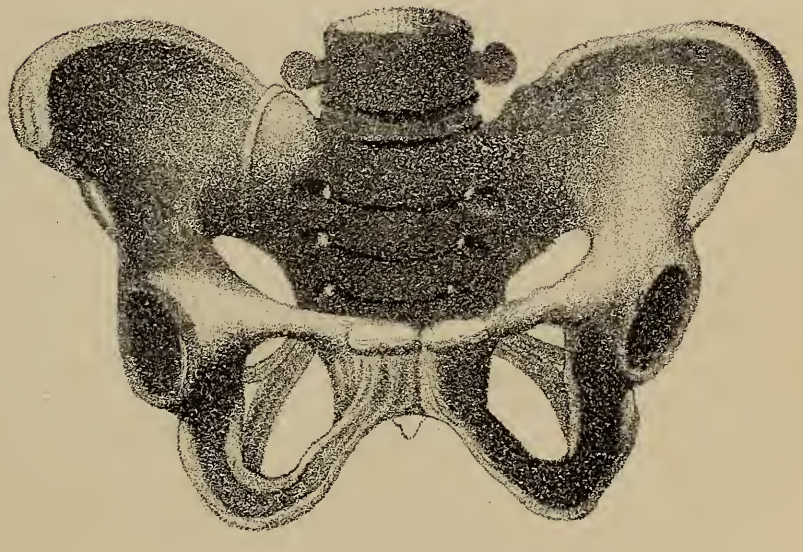
Although the general figure of the cavity is not exactly quadrilateral, we may, however, distinguish in it four sides. The posterior plane is formed entirely by the sacrum and coccyx, and is the longest; the anterior plane, which is the shortest, presents the symphysis pubis above, and the arch of the pubis below. The lateral planes are formed principally by the inner face of the ischia. These four planes, or sides, are arranged so that the anterior and posterior are nearer each other above than below, while the contrary is true of the lateral planes. This arrangement explains the necessity of the rotatory motion performed by the head of the fetus, while passing through the cavity of the pelvis, on a knowledge of which is founded the knowledge of the true mechanism of parturition.

The upper of the two openings of the lower pelvis, or the brim, is termed the superior or the abdominal strait: the lower opening, the outlet, the inferior or perineal strait. As the study of the dimensions of the two straits of the pelvis, is undoubtedly the most important thing in the practical knowledge of obstetrics, we proceed to treat of them very particularly.

Dimensions of the pelvis. Authors have endeavored to determine the figure of the superior strait, and it has been

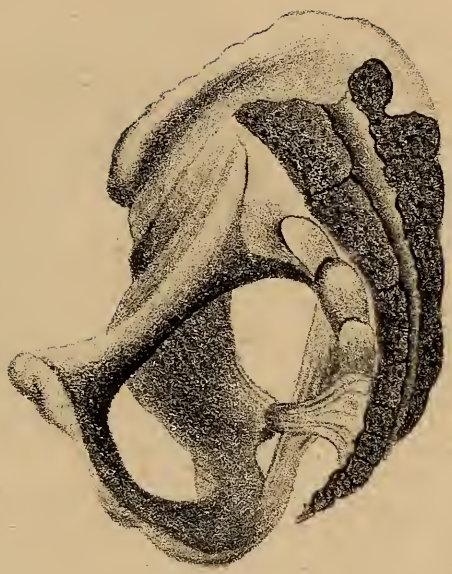


Adult Male Pelvis.

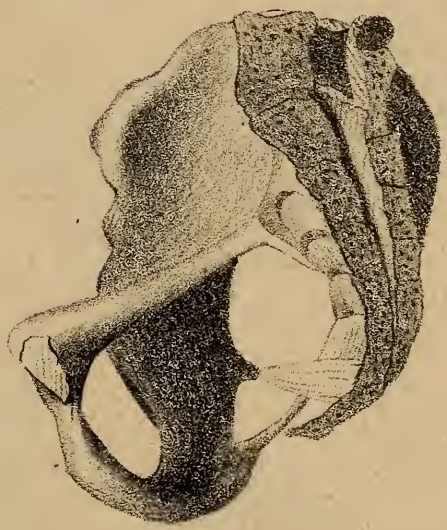


Adult Female Pelvis.

Pelvis of the full grown Fetus.

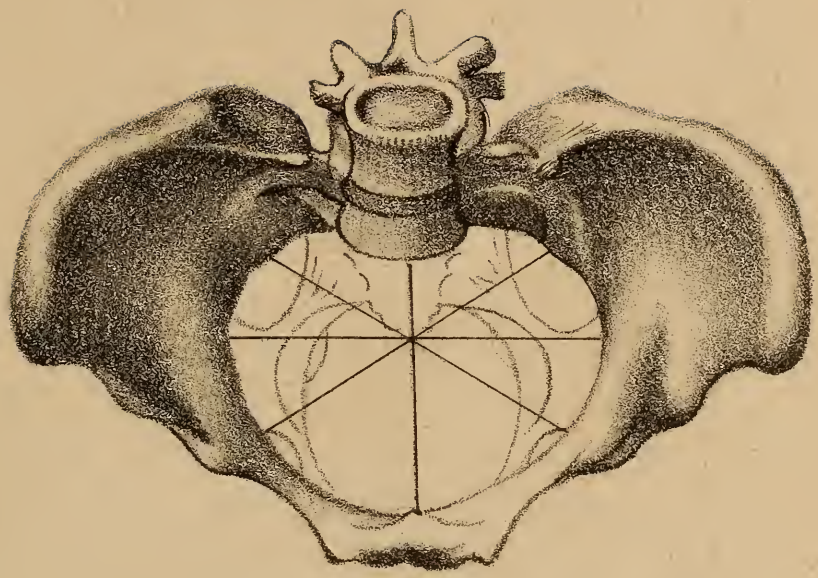


Section of the Male Pelvis.

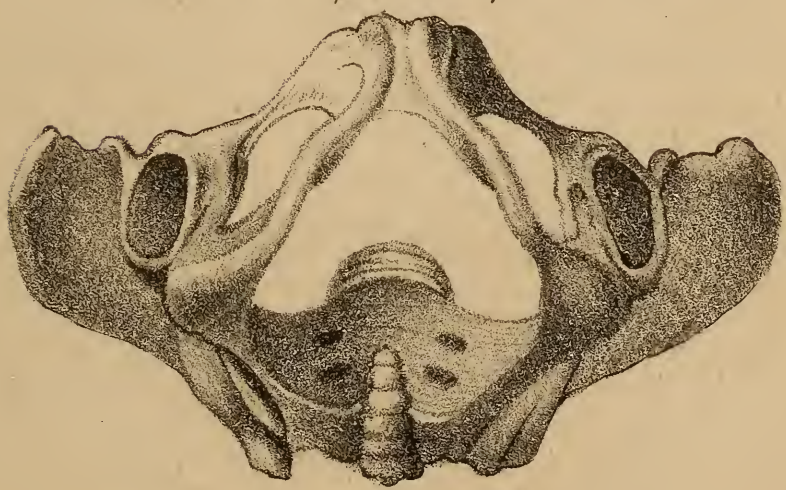


Section of the Female Pelvis.

Section of Fetal Pelvis.



Dimensions of the superior Strait



Dimensions of the inferior Strait

Pelvis of one of the Mammalia

PL V.

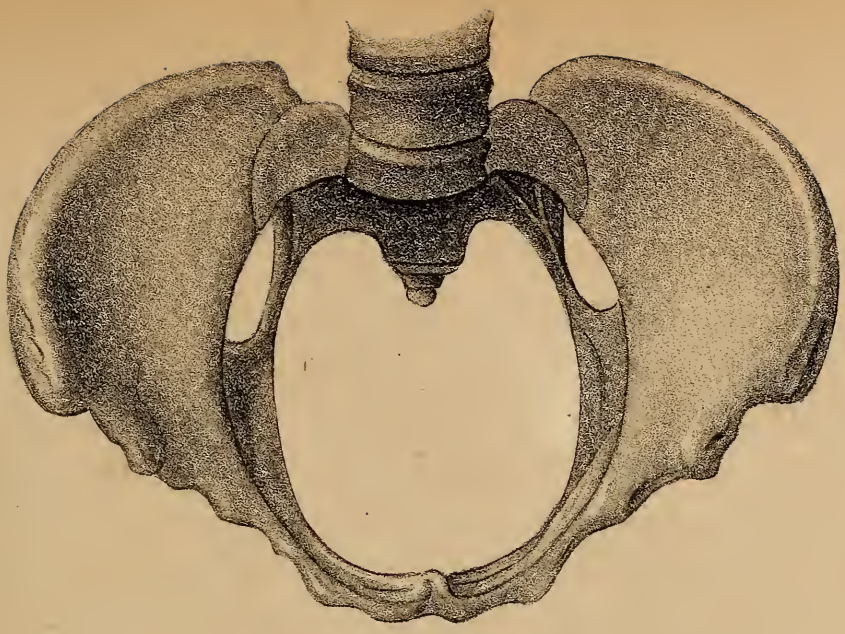


Fig 1.

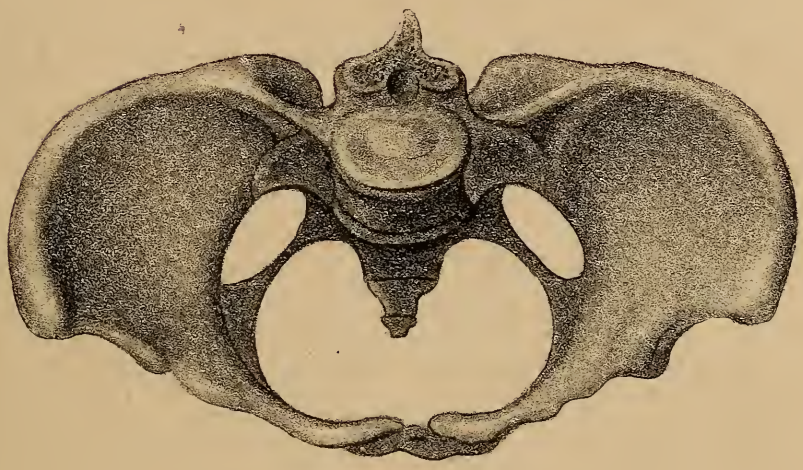


Fig 2.

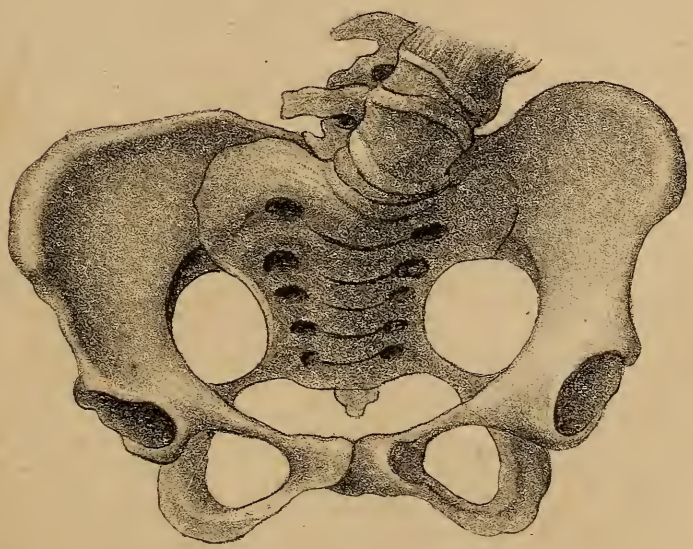


Fig 3.

Deformities of the Pelvis.

J. Pilsee del & lith. NY.

compared sometimes to a circle, sometimes to an oval, and sometimes to a curvilinear triangle. We prefer, however, to ascertain its form by determining the dimensions of the pelvis, which are as follow.

In the superior or abdominal strait, or the brim, we generally admit three diameters: 1st, an antero-posterior or sacro-pubic diameter, (*L. diametros minor*, s. *recta*, s. *conjugata*), extending from the centre of the promontory of the sacrum, directly to the upper and central part of the symphysis pubis; in a well-formed pelvis, this diameter measures from three and a half to four inches: 2d, a transverse or iliac diameter, (*L. diametr. major*, s. *transversalis.*) the direction of which is from right to left, and reciprocally from one of the sides of the abdominal strait to the opposite side, cutting the preceding at a right angle; this diameter measures five inches; 3d, an oblique, or cotylo-sacro-iliac diameter, of which there are two: one extends from the inner part of the right cotyloid cavity, to the sacro-iliac symphysis of the left side, the other from the inner part of the left cotyloid cavity to the sacro-iliac symphysis of the right side: their direction is obliquely from before backward. This diameter measures four and a half inches. (*See Pl. IV. Fig.* 1.)

The inferior or perineal strait, the outlet, has two diameters only: 1st, an antero-posterior or conjugate diameter, (*D. conjugata*) which extends from the lower part of the symphysis pubis to the extremity of the coccyx. In its usual state, this diameter measures only four inches; but, during parturition, the child's head presses the coccyx backward, and thus the antero-posterior diameter of the inferior strait is enlarged at least one inch. (*See Pl. III. Fig.* 2. *a. a.*) The dimensions of the transverse diameter never

change. It extends from one of the tuberosities of the ischium, directly to that of the opposite side. This diameter is generally four inches.

Direction and axes of the Pelvis. If we consider the situation of the pelvis in a female standing erect, supposing all the adjacent soft parts to be removed, it is easily seen that the plane of the symphysis pubis is much lower than that of the sacro-vertebral prominence. This depression gives an idea of what is commonly understood by the direction of the pelvis, the inclination of which varies from thirty-five to forty-five degrees, taking the sacro-vertebral angle as the point of departure of the horizontal line. That being given, a line drawn from about the centre of the cavity of the sacrum, passing through the centre of the brim of the pelvis, and going directly to the umbilicus of the pregnant female, forms exactly the axis of this strait. On the other hand, a second line drawn from the upper third of the sacrum, and passing through the centre of the distended vulva, forms the axis of the inferior or perineal strait.

It follows, from our remarks, that the head of the child does not proceed exactly in a straight line when passing successively through the different points of the pelvis, but on the contrary in a curve, which continues even through the external organs of generation, long after the head has passed through the centre of the outlet, as is exactly represented in *Pl. VI. Fig.* 2.

This motion does not occur in most animals, and particularly in the mammalia; in them, the two straits of the pelvis have one and the same axis, which is parallel also to the axis of the body; the direction of the latter is horizontal. (*See Pl. III. Fig.* 3.)

III. ARTICULATION OF THE BONES OF THE PELVIS.

The articulations of the bones of the pelvis resemble those of the bones of the same species in other parts of the animal economy. They are the mixed kind of some authors; the synarthrosis, or rather the amphiarthrosis of the ancients, and the articulation by continuity, of the moderns.

The articulations of which we are about to treat, and which are more generally termed symphyses, are, that of the ossa pubis, that of the sacrum with the iliac bones, that of the sacrum with the coccyx, and the articulation of the last lumbar vertebrā with the sacrum, to which must be added the description of the ligamentous and membranous parts which assist to increase the strength of the former.

Symphysis Pubis. In order to have a correct knowledge of the different symphyses of the pelvis, they must be studied in the recent state. In the recent state, the symphysis pubis is formed by a fibro-cartilaginous substance of a prismatic or triangular figure, which is perfectly included in the space between the articular surfaces of the ossa pubis, with which it is connected. This substance is white, elastic, thicker anteriorly than posteriorly, and is rendered firm in its position by very many ligamentous and aponeurotic parts, and also, in its lower portion, by a special cruciform ligament. In a first confinement, the head of the fetus sometimes vibrates upon its sharp and flexible edge, before emerging freely from the external organs of generation.

The tissue, in the centre of the triangular cartilage, is evidently less dense, and more flexible: hence, the possibility of a slight but real motion in the symphisis pubis;

this has been observed particularly in females who have died in the latter periods of pregnancy. The sensation also of weariness and fatigue complained of for a long time after a tedious and difficult labor, also depends on this.*

Sacro-iliac symphyses. As the mechanism of the sacro-iliac symphyses is not the same as that of the symphysis pubis, a difference naturally exists in their mode of articulation. The sacrum is articulated with the iliac bones by the ragged and uneven arrangement of the articular surfaces which we have mentioned above. Each of these surfaces is incrusted with a thin and compact layer of cartilage, which, by means of its numerous points of contact, causes the intimate connection of the bones, but is not entirely sufficient for their articulation, without the aid of strong and numerous ligaments which entirely surround it, particularly at its posterior part.

Sacro-coccygeal symphisis. The sacrum is connected with the coccyx, and the different parts of the latter are united with one another by a fibro-cartilage of a soft spongy texture, and by some longitudinal ligamentous fibres. The extreme mobility of the coccyx, and the facility with which it is pushed backward while the head is passing through the outlet, depend upon this favorable arrangement.

Sacro-vertebral symphysis. This articulation resembles that of the other vertebræ with each other. It is interesting in obstetrics, only on account of the relations of the

* The eminent German anatomist, Meckel, considers this flexibility or softening of the cartilage, as occurring normally in every state of pregnancy, and states that "the softening begins to take place in the eighth month of pregnancy, that is, precisely at that time when the lower region of the genital organs begins to enlarge and to secrete a great quantity of mucus."

Meckel's Anatomy, vol. 2. p. 45.

last lumbar vertebra with the sacrum, and the more or less prominent angle formed anteriorly by these two bones.

Besides these different modes of union, which serve to render the bones of the pelvis firm, there are also some which are not used for the same purpose, but which circumscribe the lower part of the pelvis, and which have the solidity, but not the weight and size of bones. There are four of these ligaments, two on each side; they are termed the sacro-iliac ligaments.

IV. DEFORMITIES OR DEVIATIONS IN THE FORMATION OF THE PELVIS.

By deformities or deviations in the formation of the pelvis, we understand every species of alteration in its natural and regular form, the consequences of which may have a more or less remarkable influence on the fortunate termination of parturition.

Authors apply to the pelvis the terms deformed and malformed with indistinctness; there is, however, a wide difference between them: a pelvis may be deformed, while its conformation is regular, and it may have a malconformation, although it be not deformed: it is important to establish this distinction. In fact, a deformed pelvis is always more or less injurious to the termination even of natural labor; it either quickens its progress when the pelvis is too large, or retards it very much when the pelvis is extremely narrow. The deformities of the pelvis regard its dimensions: its malconformation affects its form. A malformed pelvis is not always injurious to the termination of labor: a deformed pelvis, whether malformed or not, always prevents it to a greater or less extent.

A pelvis may be deformed, either by being too large or too small. (*See Pl. V. Fig.* 1 *and* 2.) In the former case, the life of the child may be much endangered by a too rapid delivery, as a species of asphyxia most generally attends its too hasty expulsion. The mother even is not always exempt from accidents during gestation, or during the expulsion of the fetus. The extreme obliquity of the uterus during pregnancy, its prolapsus, and its inversion after parturition, most generally result from an excessive size of the pelvis. However fearful an excess in the size of the pelvis may be for the mother and child, its narrowness is still more to be dreaded, when this narrowness is so great as not to allow the labor to be terminated by nature alone.

Narrowness of the pelvis is generally attended with a malconformation, and the great difficulties of certain unnatural labors must be attributed to this circumstance. The narrowness of the pelvis unattended with malconformation, may generally be measured and calculated by certain instruments which we shall mention hereafter. This is not the case with its malconformation, the nature of which cannot always be determined during the life of the female. (*See Pl. V. Fig.* 3.)

The direction of the vertebral column may be perfectly natural in a female whose pelvis is excessively deformed: on the other hand, it may vary more or less, and present very evident deformities in a female where the pelvis is well formed (*See Pl. VI. Fig.* 3.); hence the practitioner should be very careful in his diagnosis, as it is very easy to be deceived in choosing the means indicated for terminating the labor.

Whatever may be the degree of alteration in the form of the pelvis, its narrowness varies in different individuals: it may be only a few lines in the diameter of a pelvis which is normal in other respects, and the termination of the labor may not be impeded. In other cases, on the contrary, the narrowness may exist to such a degree, that the opening between the straits may be only a few lines, in which case the termination of the labor in the natural way is physically impossible.

The narrowness of the pelvis affects sometimes the superior or abdominal, and sometimes the inferior or perineal strait. In the former case, the contraction always occurs in the antero-posterior or sacro-pubic direction: in the second case, in the lateral or ischiatic direction; so that when no very remarkable deformity exists, the enlargement of one of these straits is always inversely as the contraction of the other. (*See Pl. VI. Fig.* 1 *and* 2.)

The most common causes of the deformity or malconformation of the pelvis, generally act with a certain degree of intensity, only during the early periods of life. Scrofula, so common among those nations who live in the temperate parts of Europe, may be considered as the most common and the most general cause. The symptoms attendant upon the first dentition in young girls of the higher class in life in large cities, the ignorance and forgetfulness of the laws of Hygeia in the working and indigent classes, add singularly to the cause first mentioned: hence why labors are generally less difficult among females who reside in the country than in those of cities; the latter require the resources of art more frequently.

The following is a scale of the proportions proper to direct the young practitioner in the study and practical application of the means to remedy the difficulties resulting from the defects or malconformation of the pelvis.

When the pelvis measures four, three and three quarters, or three and a half, inches, the labor does not require the assistance of art; nature will complete it alone. When the pelvis is from three and a half to three inches, or two and three quarter inches, and one or two lines less, the forceps must be applied.

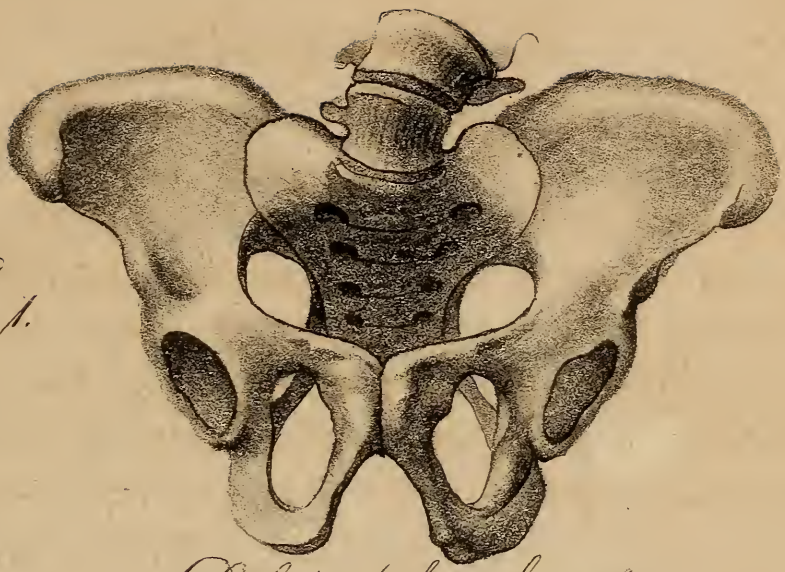
When the pelvis is two and a half, two and a quarter, two inches, or one inch and three quarters, the operation of symphysiotomy is necessary.

Whenever the antero-posterior diameter of the pelvis is less than one inch and three quarters, the child cannot be born through the vagina: we must resort to the Cesarean operation.

Mode of determining the defects of the pelvis in a female while living. The necessity for examining the pelvis exists not only in pregnant females, before and during labor, in order to determine to what extent the pelvis may be deformed, but it is often required in young females, in regard to whose formation, parents having well-grounded fears, request the opinion of an enlightened physician, to know to what extent their children, if married, may hope or fear to become mothers. Whatever else may be the circumstances under which physicians are consulted, the means are the same, the mode alone of their application differs.

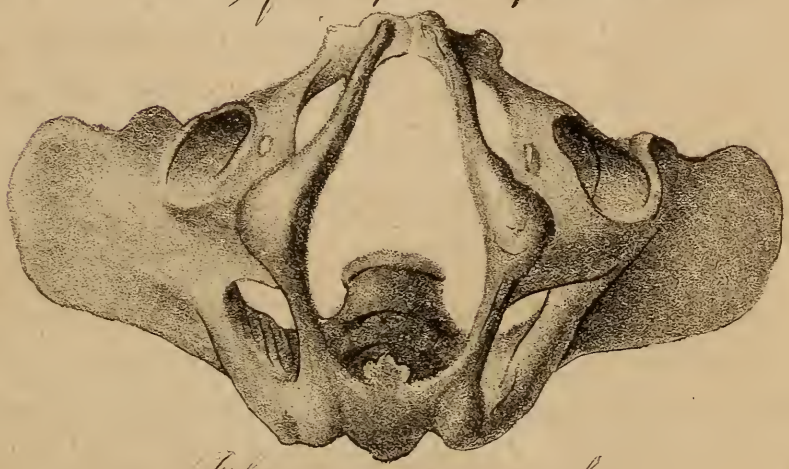
Before proceeding to a more particular examination, let us take a general view of the formation of the person in regard to whom we are consulted. If the female in fact be

Fig. 1.



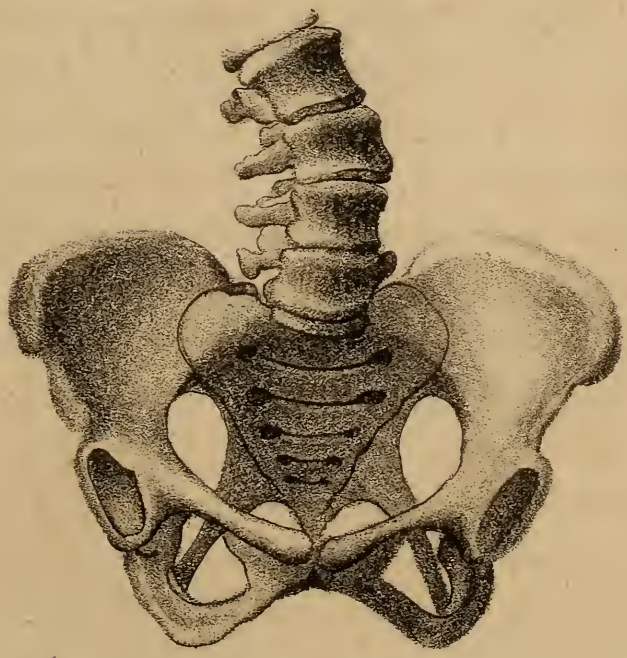
Defects of the inferior Strait.

Fig. 2.



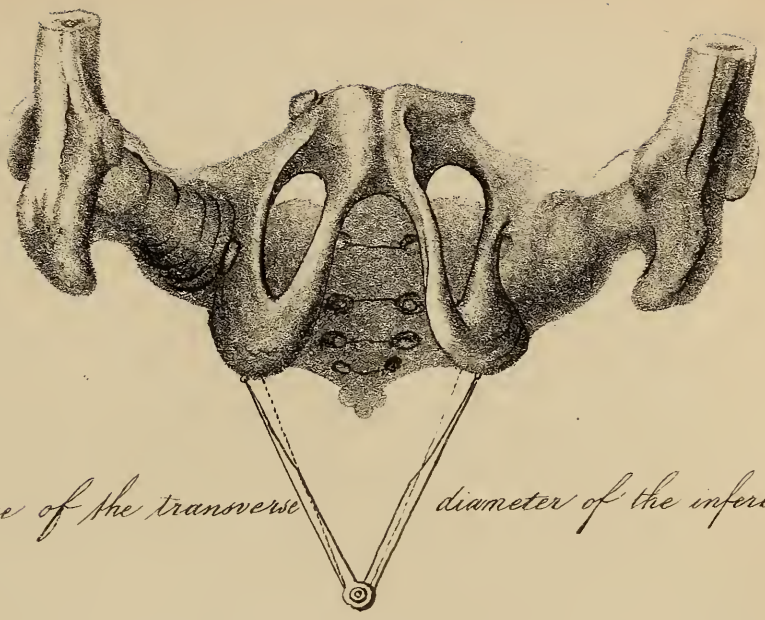
Pelvis seen underneath

Fig. 3.



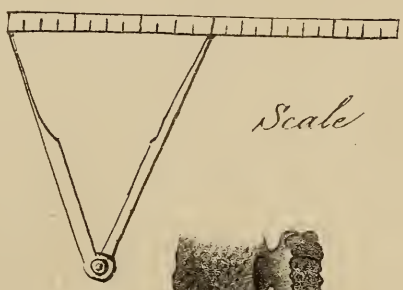
Regular Pelvis with a deviated column.

Fig. 1.



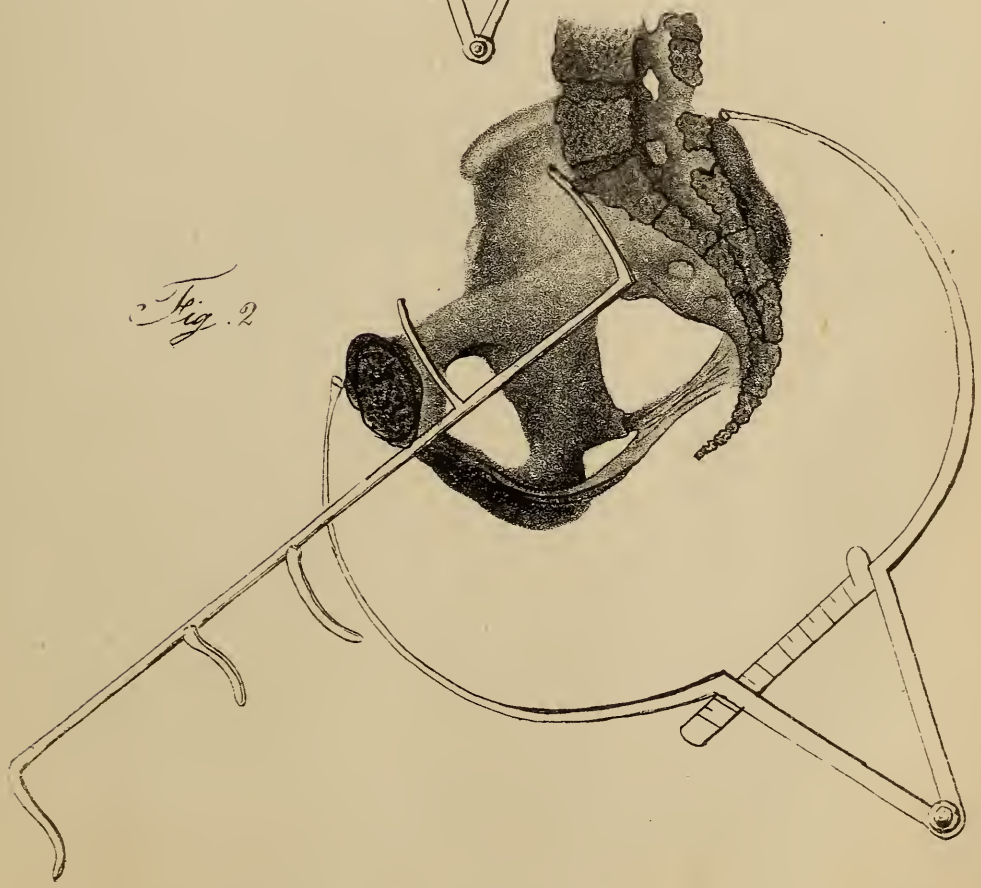
Measure of the transverse diameter of the inferior strait

Fig 3



Scale

Fig. 2



Application of the Callipers & the pelvimeter

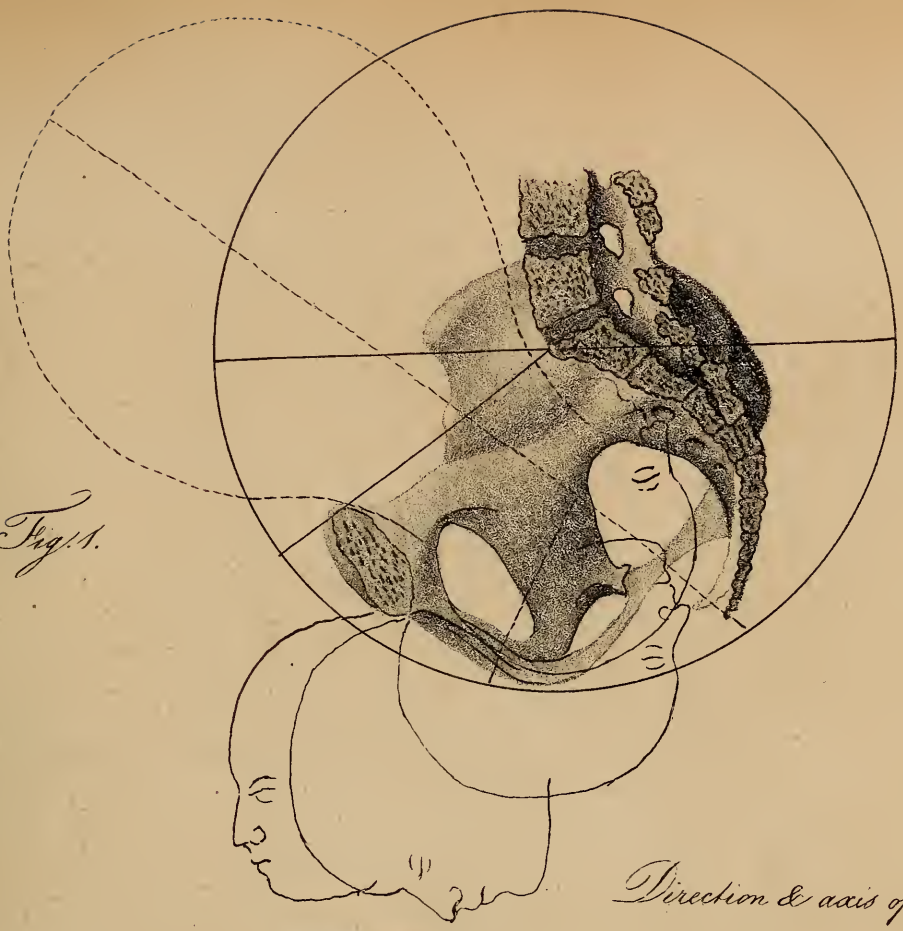
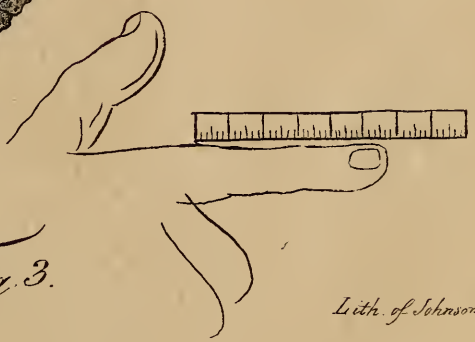


Fig. 1.

Direction & axis of the Pelvis.

Fig. 2.

Measurement of the Sacropubic diameter, by the Index finger.

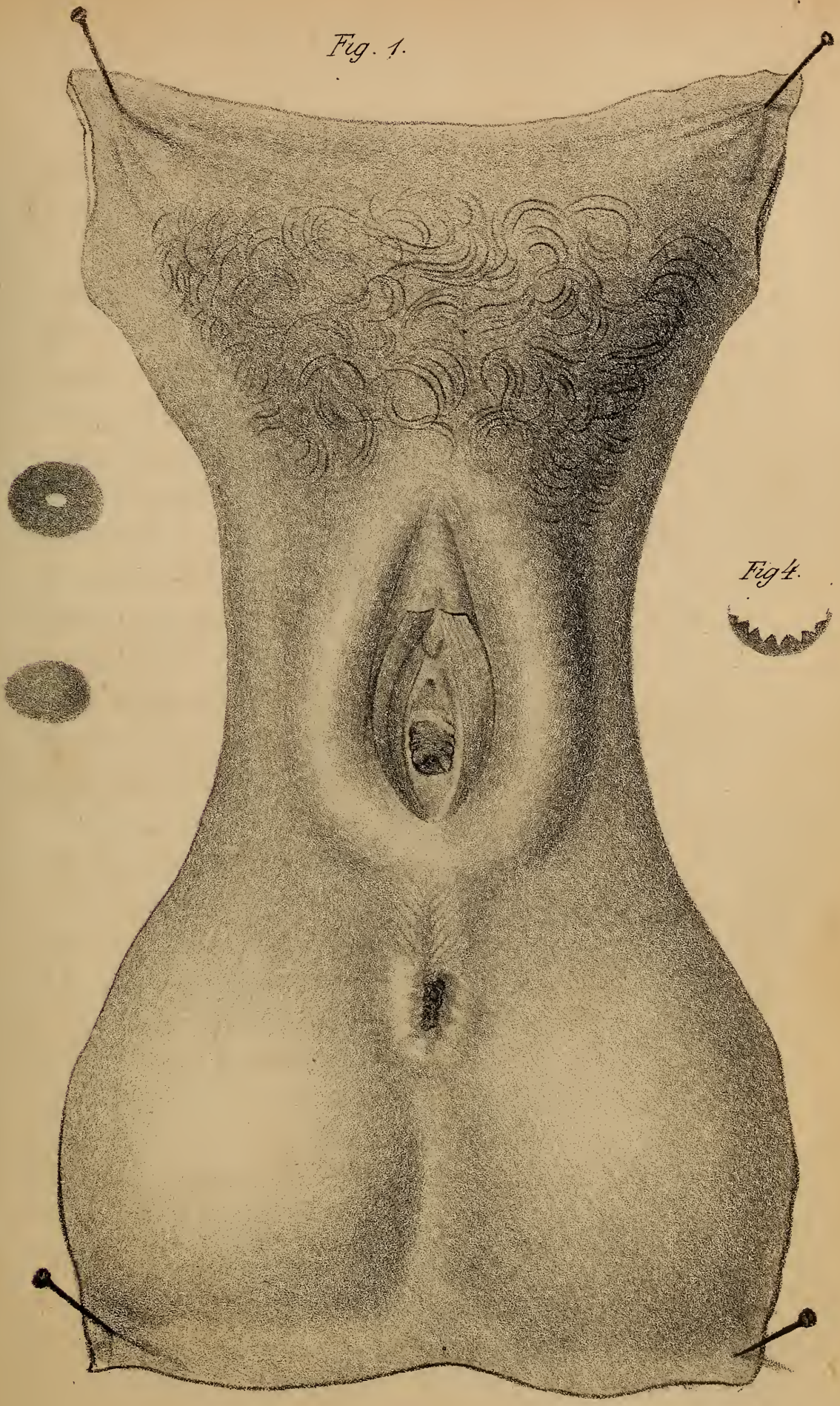


Scale.

Fig. 3.

Lith. of Johnson N.Y.

Fig. 1.



2.

3.

Fig 4.

External Organs.

E. Bisbee del &

short, the arms very long compared with the rest of her body, the chin long, the eyes large and blue, the skin white, and the flesh soft, these circumstances are calculated to lead us to fear some deformity of the pelvis: in such a female the legs are generally crooked, and her form is not straight. By placing one of the hands flat upon the posterior part of the sacrum, and two or three fingers of the other on the anterior part of the symphysis pubis, we may also determine, from the short distance between these opposite regions, when the pelvis is narrow, and even distinguish its deformity by the propinquity and the unevenness of the anterior superior spines of the iliac portion of the coxal bones. But we must admit, that however great our care in the first examination, we must not depend solely upon these simple measurements, if we would determine exactly the real degree of alteration in the pelvis.

Several instruments have been invented to ascertain in the living female the real dimensions of the pelvis: only two, however, have been approbated by the profession; these are, the callipers and the pelvimeter of Coutuli. The first is applied externally, the second is introduced into the internal genital organs of the female. They are both figured in *Pl. VII. Fig.* 2.

Callipers. This instrument is composed of two movable arms, which are rounded externally, and when placed upon the female open sufficiently wide to embrace the haunches: when used carefully its application is easy and convenient. Each arm terminates in a button, and is perforated at its posterior part, through which a graduated arc or scale can be passed at pleasure. The object of this scale is to indicate the extent of the parts contained and passed over by

the two arms when they are properly used. The instrument should be applied upon the naked body, or over the chemise when the female objects to being exposed. One of the buttons should be placed against the anterior and superior part of the symphysis pubis, the opposite arm on the tubercle of the last lumbar vertebra. It is very important to determine with care the exact spot where the posterior arm is applied, since as this operation is generally performed upon females in whom the pelvis is more or less defective and malformed, we may easily be deceived without this precaution, and be led into errors fatal both to the mother and child.

If the callipers are well applied, the scale points out, without removing the instrument, the extent of the parts of the female included in the space between the two buttoned arms: if we now subtract the thickness of the symphysis pubis, which is six lines, and that of the upper part of the sacrum, which is two inches and a half, the remainder is the exact measure of the space between the sacro-vertebral angle, and the internal or posterior part of the symphysis pubis.

The advantages of the application of the callipers seem incontestable; they however present several inconveniences which cannot be avoided, if we should confine ourselves to their employment alone.

Independent of the difficulties which sometimes attend its application, and the errors into which we may consequently fall from a want of experience, we cannot deny but that it gives strictly only the thickness of the pelvis, considered from before backward, when covered by the soft parts: this mechanical agent, applied with the utmost pos-

sible precision, indicates neither the peculiar nature of the deformities of the pelvis, nor the degree of deviation of the sacro-vertebral prominence, nor the other peculiarities unfavorable to the termination of parturition, which may exist in the cavity of the pelvis.

Pelvimeter. These considerations doubtless led Coutuli to invent a new instrument, termed by him the pelvimeter. This instrument consists of two parallel branches, which slide with facility upon each other, and which terminate by two raised extremities: it is introduced within the vagina, and is directed towards the sacro-vertebral prominence. When there, we draw towards us the upper branch, the end of which stops on the inside of the symphysis pubis: the portion of this branch drawn outward is graduated into lines, so as to give the exact measure of the true distance which the inner branch passes over, and consequently of the sacro-pubic diameter. This is the great advantage of the pelvimeter, and the object which the inventor expected to attain: but this instrument, although ingenious in its combinations, presents numerous inconveniences, which have caused it in a great measure to be abandoned: these are, the difficulty and the danger attending its introduction.

If it be demonstrated, that the inconveniences attending the employment of the two instruments which we have described, do not allow our researches to be confined to their application alone, when we foresee the necessity of employing artificial means to terminate the labor, the safety of the female and that of the child then require a stricter examination, which shall be perfectly certain, and which shall insure the practitioner the utmost safety in regard to the results of his investigations. This can be attained by touch-

ing: by introducing the index finger of one hand into the vagina, the practitioner can acquire all the knowledge relative to the examination he proposes to make; he is not only able with his finger to reach the sacro-vertebral angle, and thus to determine the real extent of the sacro-pubic diameter, but he has also the advantage by this means of passing over the whole extent of the cavity of the pelvis, and of detecting and of becoming acquainted with the different kinds of alterations, and with all the obstacles which may more or less oppose the termination of the labor.

In order to make this examination properly, the female should stand erect, her shoulders resting against a solid plane; the index finger of one hand is then carefully introduced into the vagina, directed obliquely upward and backward towards the sacro-vertebral prominence, and rested on its centre. We then raise the radial side of the finger towards the arch of the pubis, pressing slightly upon its cutting edge, and make a mark or depression with the nail of the index finger of the other hand upon that which is introduced, as near as possible to the body of the pubis; we now withdraw the finger, and measure the extent between the small mark mentioned above, and the end of the finger, by placing it upon a scale. (*See Pl. VIII. Fig.* 2 *and* 3.)

From the sum total of the portion of the finger introduced, we must subtract six lines for the thickness of the symphysis, and two or three lines for the degree of obliquity the finger has in passing through the interior of the pelvis. The remainder then forms the exact measure of the space between the sacrum and the symphysis pubis, and

gives the true measure of the antero-posterior or sacro-pubic diameter.

Some inexperienced practitioners may sometimes be fearful, if they cannot reach the sacro-vertebral prominence, and thus perhaps be very much at a loss to form an opinion in regard to a female submitted to them for examination. Let them be assured that the pelvis of the female in this case is not deformed, and that the antero-posterior diameter is large enough to allow the passage of a child's head of common dimensions.

The mode of determining the deformities of the inferior or perineal strait is not very difficult: in most cases it will only be necessary for the female to lie on her back, her legs flexed on her thighs, which are separated and raised towards the abdomen: thus the two tuberosities of the ischium are remarkably prominent, and it is easy to perceive the distance between them. If we wish for more exact results, the distance between the two tuberosities may be measured by the rounded extremities of a pair of common compasses, and then by applying the compasses to a scale, we may estimate within half a line, the extent of the ischiatic or transverse diameter of the lower strait. Here there is no necessity for subtracting; all the extent embraced between the legs of the compasses should be estimated, and this forms the absolute measure of the diameter.* (*See Pl. VII. Fig.* 4.)

* While this sheet was going to press, one of my pupils, Mr. Martin, showed me an instrument for measuring the pelvis, termed a *pelvigraph*, which is worthy the attention of practitioners. Its plan is very ingenious, and its description and figure will be given hereafter.

OF THE SEXUAL PARTS OF THE FEMALE,

CONSIDERED IN THEIR RELATIONS WITH THE GENERATIVE FUNCTIONS,

AND

THE PRACTICAL SCIENCE OF OBSTETRICS.

The genital organs of the female should be studied in two different points of view: 1st, in a state of rest or vacuity; 2d, in that of action or fulness. Hence the nature of the changes in the sexual parts of the female, during the performance of the generative functions, and also the order in which these changes are developed, cannot be well understood without an exact knowledge of the same parts in a state of rest or emptiness. They should be described with care: we proceed to this subject.

The genital organs of the female have generally been divided into external and internal parts. Although there is no reason in anatomy for this distinction, it will be preserved for the convenience of demonstration.

I. EXTERNAL GENITAL ORGANS OF THE FEMALE.

The study of the external genital organs of the female requires no special preparation. We have merely to look at the external labia when slightly separated, to perceive successively all the objects about to be described.

When the external parts are in the natural state, and perfectly approximated, we perceive only the external labia and the fissure between them; (*See Pl. IX.* which represents with great precision, and most scrupulous fidelity, these parts in their most natural state), but if they be slightly separated, we then observe with facility all the objects forming what is termed the vulva or the pudendum. (*See Pl. X.*)

The vulva is composed of the mons veneris, the external labia, the clitoris, the vestibule, the internal labia, the meatus urinarius, and the canal of the urethra, the hymen, the fourchette, the frenum, the carunculæ myrtiformes, the perineum, and the entrance of the vagina.

Mons veneris or *Penil.* This is a rounded and more or less prominent eminence, situated in front of the pubis; it is covered with hairs at the age of puberty, which vary in number, length, and color, according to the age of the female, although their color generally resembles that of the hairs of the head.

The mons veneris is formed of a great quantity of fatty cellular tissue, directly covered by the skin. It also possesses arteries, veins, lymphatics, and nerves.

External labia. These are two in number, and form the sides of the fissure which they circumscribe: they extend from the mons veneris to the perineum. Their extremities unite, and form the commissures of the external labia, which are thicker above than below. They are generally very large in females who are fleshy. Their external face is brown: it is formed by a prolongation of the skin of the inner and upper part of the thigh, on which are numerous sebaceous follicles.

The inner face is reddish, smooth, and shining: it is covered by the mucous membrane, and is connected in its whole anterior portion with the inner face of the external labium of the opposite side, and more deeply with the internal labia.

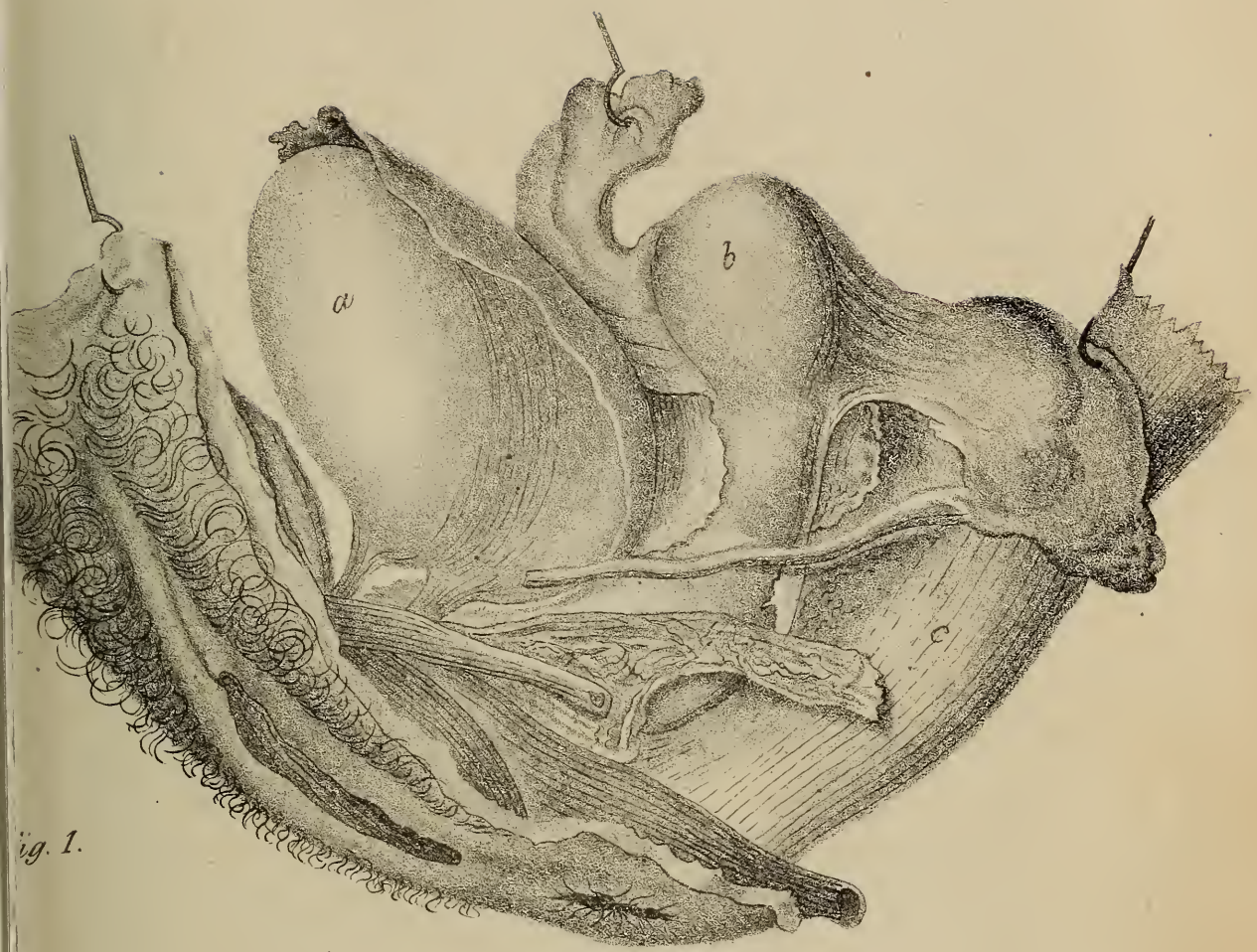
The external labia are composed of a great quantity of cellular tissue, similar to that of the mons veneris. We also find in them some cellulo-fibrous bands, some distinct fibres of the constrictor vaginæ muscle, and a great number of vessels of all kinds.

Clitoris. This is a tuberculous oblong body, which varies in size: it is situated at the upper and middle part of the vulva, above the vestibule, and between the internal labia, and is most generally concealed by the external labia. This body is sometimes so large in certain females, that it resembles in some measure the penis of the male. This circumstance may deceive some persons, and lead them to believe that the two sexes may be united in the same individual.

The clitoris is composed first, of a species of rounded glans, which is imperforate, and surrounded with a membranous fold formed by the mucous membrane, similar to the prepuce; this is continuous laterally with the nymphæ: second, of a cavernous body attached by two roots, like that of the male, to the descending branches of the pubis, and supported from the symphysis by a kind of suspensory ligament, which is flattened from right to left.

The structure of the clitoris is similar to that of the penis, with this difference, however, that the spongy tissue of the first is less abundant and more compact.

Internal labia or *nymphæ.* By this term we understand two membranous and erectile folds, which are flattened transversely; they are of a vermilion red, are thicker in the



ig. 1.

a. *Bladder.*
b. *Uterus.*
c. *Rectum.*

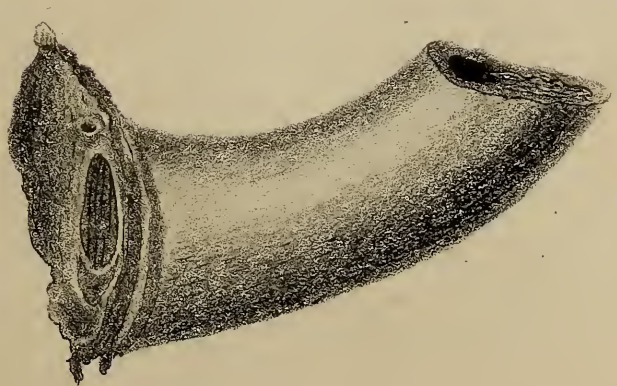


Fig. 2.

Vagina.

Internal Organs.

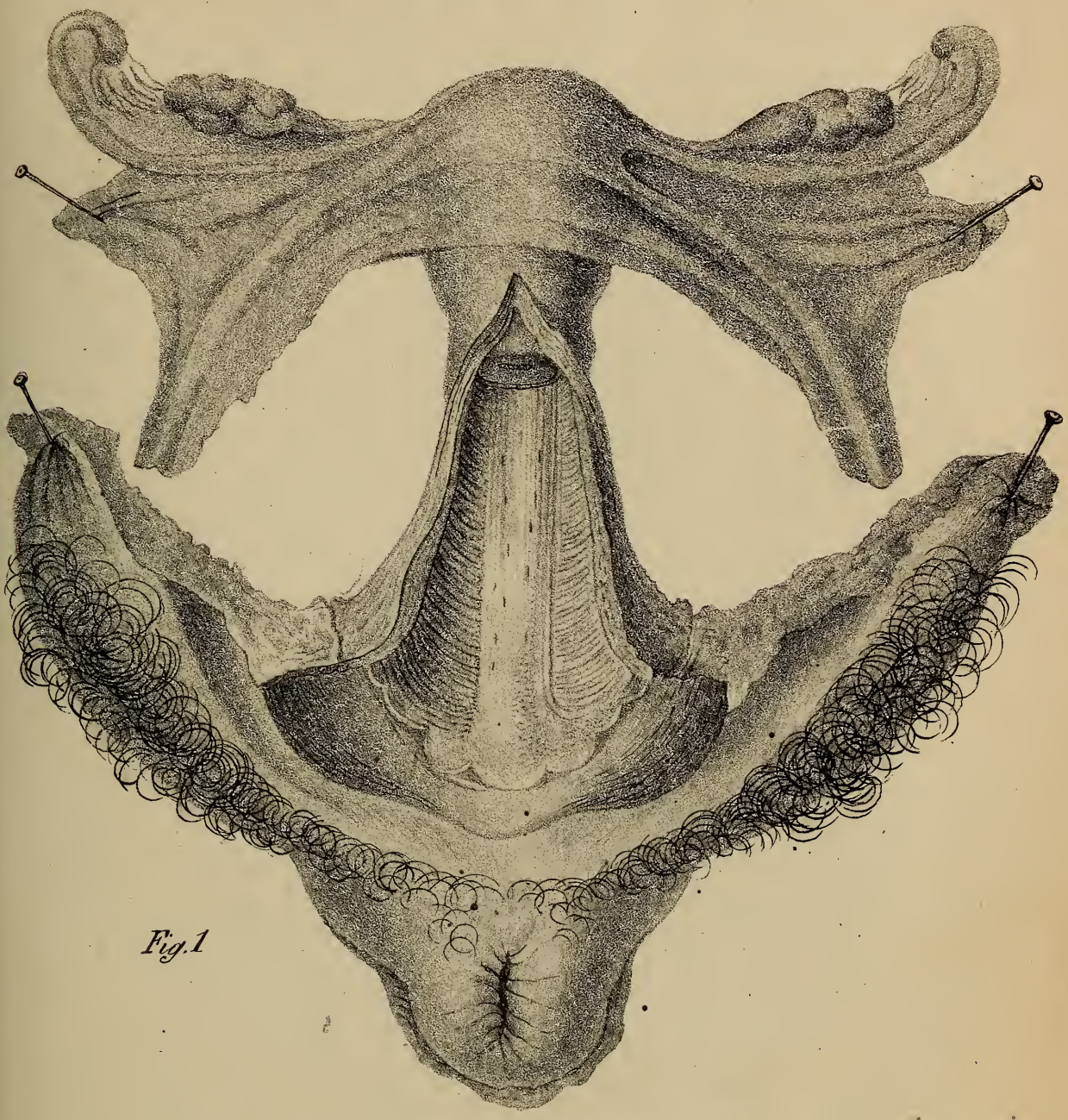


Fig.1

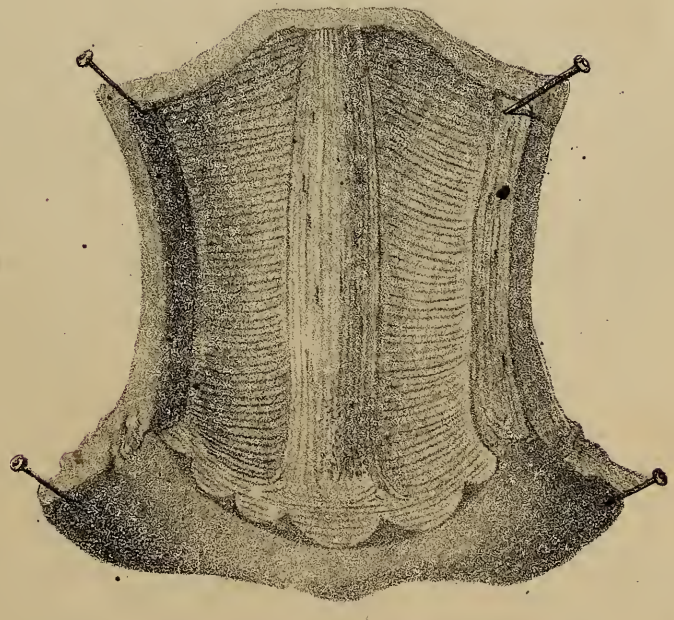
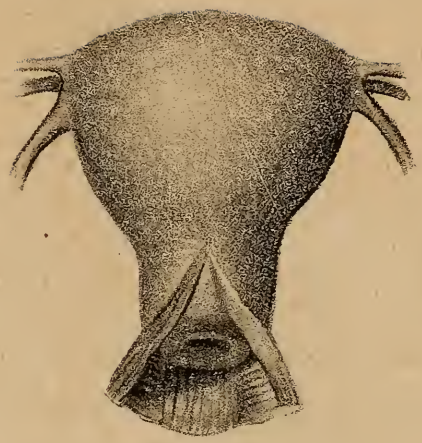


Fig.2.

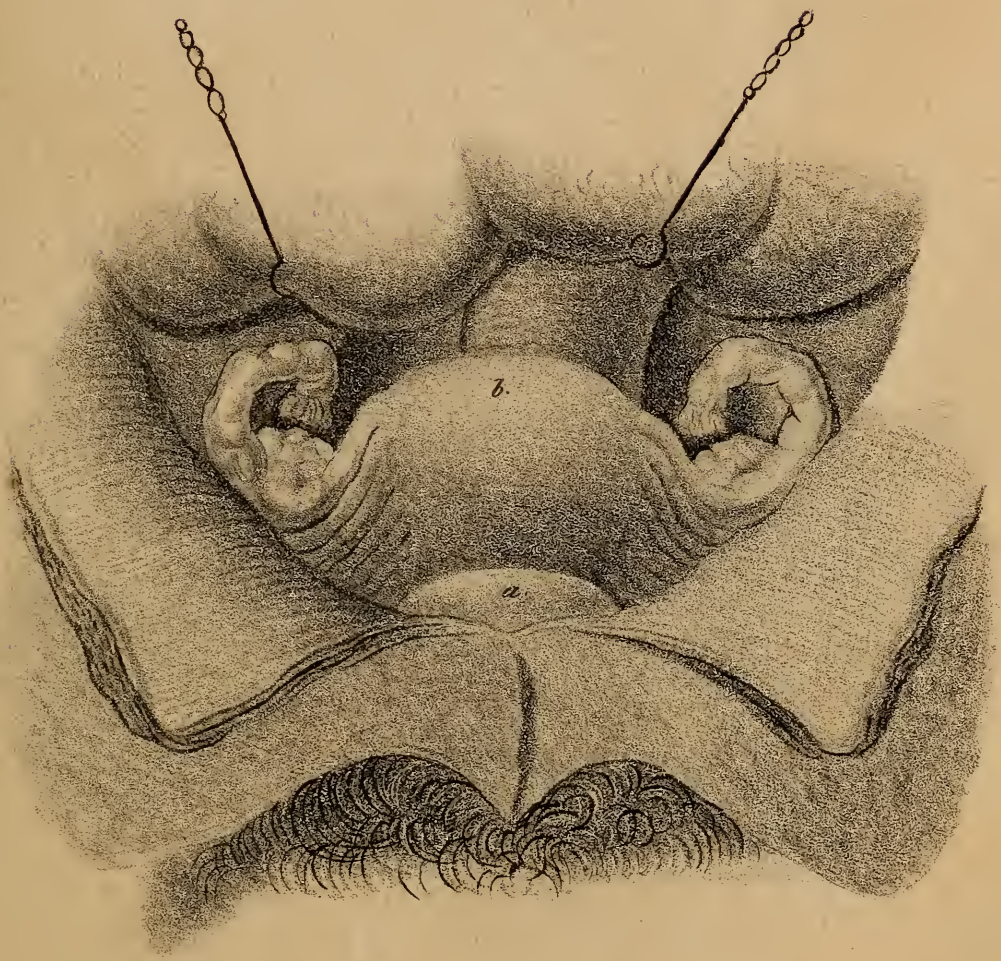
Internal Organs.

Lithog. of Imbert.

fig 1.



Uterus.



Bladder.

Uterus.

Relations of the Uterus with the Bladder and Rectum.

J. Bisset del. & lith. W.S.

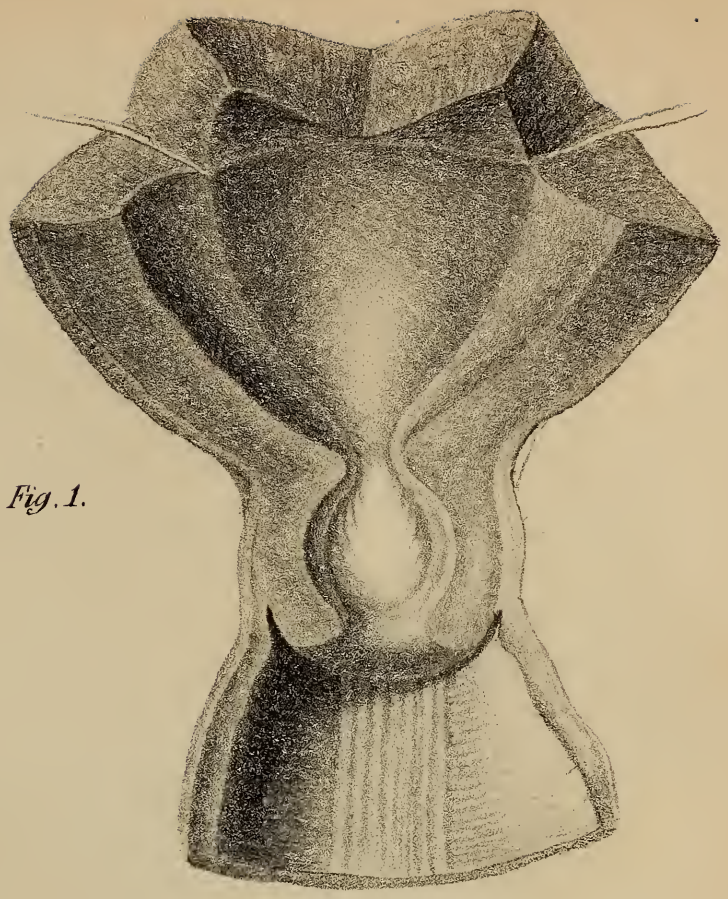


Fig. 1.

Interior of the Uterus.

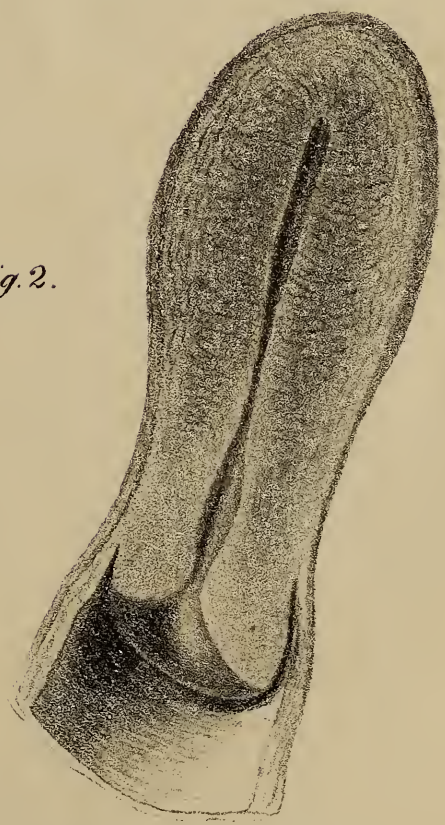


Fig. 2.

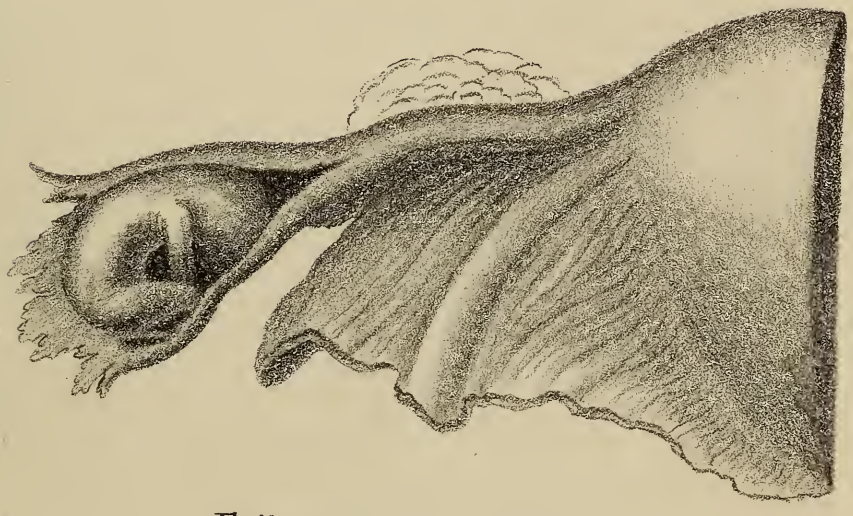
Vertical section of the Uterus.

Drawn & Lith by D. A. Johnson N.Y.

Fig. 1.

Fallopian tube

Fig. 2.



Fallopian pregnancy.

Fig. 3.

3.

Ovary.

Fig. 4.

Section of the Ovary.

Drawn & Lithog. by D.G. Johnson N.Y.

centre than towards the extremities, and arising from the prepuce of the clitoris. The internal labia are very near in this place, but separate continually, and terminate on the inner surface of the external labia, they becoming much thinner towards the centre of the edge of the orifice of the vagina. The nymphæ are very much developed in females at birth, and are generally of a moderate size in adult women. Their size and length vary much; these variations depend on age, on the race, and the diseases which may affect them. In some cases it becomes necessary to divide them: this operation, which is by no means unfrequent, does not seem to be attended with very bad consequences. The internal labia are composed, each, of a portion of the mucous membrane of the vulva folded upon itself, so as to give rise to two folds, between which is a slight layer of erectile tissue. A great number of vessels of every kind, which ramify infinitely in their surface, also enter into their composition.

Vestibule. By the term vestibule, we understand the slightly depressed triangular space, which is situated below the clitoris, above the urethra, and between the nymphæ. In some females who are not strictly attentive to cleanliness, we find a quantity of sebaceous matter, which may deceive and lead one to suspect the presence of syphilitic disease.

Meatus urinarius, and urethra. The term meatus urinarius is applied to the opening at the base of the vestibule, the edge of which is surrounded by a sac formed by the mucous membrane of the vulva, which is always more prominent below than above. The urethra is the canal which proceeds from the meatus urinarius into the bladder. It is not remarkably broad; it is only about one inch long: it is

situated a little obliquely upward and backward, below the symphysis pubis, above the vagina, with which it is intimately united, and is continuous forward and downward with the meatus urinarius, and behind and above with the bladder. Hence the canal of which we are speaking, describes a slight curve, which is concave upward, on the side of the pubis, and convex downward, on the side of the vagina. The interior of the urethra is covered by the mucous membrane, and is reddish: this membrane forms a great number of very prominent longitudinal folds, and we observe, especially at the base, a great many mucous lacunæ. Externally, it presents a slight layer of spongy tissue; but there is no body corresponding to the prostate gland of the male.

Hymen. The hymen, termed by some authors the *virginal* or *vaginal valve*, is a more or less extensive membranous fold, varying in figure, formed by the mucous membrane of the vulva, just when it enters the vagina. It is situated at the posterior and lateral part of the external orifice of the vulvo-uterine canal, which it closes more or less perfectly. The hymen is generally very thin; sometimes, however, it is very thick: its form is most generally semilunar; sometimes oval from right to left, or almost circular, with an opening in the centre; and in some very rare cases, it has the latter form, but presents no opening; it is then imperforate: when this is the case, it prevents the discharge of the menses. Some celebrated accoucheurs assert, that they have found the hymen so strong that it prevented the termination of the labor: to facilitate which, they have been obliged to make a circular incision in it. The absence of this part, always supposes the action of some mechanical cause which has broken it. Nurses, by roughly rubbing

the sexual parts of female infants with coarse towels, and ulcerations of these parts also, may alter, and even destroy, this emblem of virginity; when the hymen does not exist, females are accused of having been deflowered upon too slight grounds.

Carunculæ myrtiformes. This term is applied to small, flat or rounded reddish tubercles, of various sizes, formed, as is generally thought, of the remnants of the hymen, but attributed, by Professor Beclard, to the existence of the mucous membrane, enlarged in this place. It would follow, from the latter opinion, that the carunculæ myrtiformes ought always to exist before the rupture of the hymen; but all authors agree, that they are seen only in females who are not virgins. Be this as it may, they are from two to five or six in number: they vary also in color and consistence in different subjects. They may be of a vermilion red, livid or pale, firm or soft. From all these remarks, we must be cautious in admitting that the presence of the hymen may always be regarded as a certain sign of virginity, since its absence is not always an evidence of defloration.

Fossa navicularis. The navicular fossa is a small cavity situated at the posterior part of the external orifice of the vagina, between the carunculæ and the posterior commissure of the external labia, termed the fourchette or frenum. It is very difficult, in a first confinement, for this latter part to resist the efforts made by the head to escape from the external parts; but its rupture is unattended with bad consequences: we cannot say the same when the rupture involves a greater or less portion of the perineum, as we shall mention hereafter.

Perineum. This is the space situated between the posterior commissure and the anus. It is divided lengthwise

into two equal parts, by a kind of suture, termed the *raphe:* it is shorter and narrower in the female than in the male, and hence is very much exposed to laceration, during the first confinement, especially if the female intrusted with the management of the head, does not sustain it carefully, by pressing it upward with the hand on an inclined plane, and thus pushing it towards the centre of the distended vulva, in order that it may escape freely through this opening.

II. INTERNAL ORGANS OF GENERATION.

The internal organs of generation are, the vagina, the uterus, and its appendages. The study of these different organs necessarily demands preparations, not required for that of the external parts: we think we have performed a task as happy in its results as it was difficult to execute, in *plates XI. XII. XIII. and XIV.*, which present views of these organs, perhaps never seen before.

Vagina, or vulvo-uterine passage. This is a cylindrical and membranous canal, situated in the smaller pelvis, extending a little obliquely from below upward and from before backward, from the neck of the uterus which it embraces, to the centre of the vulva, at the base of which it opens: this canal is slightly curved on itself, so as to be concave forward on the side of the bladder, and convex backward on the side of the rectum: we also remark, that its anterior wall is shorter than the posterior. The vagina is narrower at its centre than at its two extremities. When not distended, it is from five to six inches long.

In the vagina we distinguish an external and an internal

surface, and two extremities; one of which is superior, the other inferior.

Superiorly, the external surface is covered above and behind by the peritoneum: before and below, it is united to the bladder and the canal of the urethra by cellular tissue, which is more compact the lower it is examined: behind and below, it is connected with the rectum, to which it is united by some cellular tissue of the same character: on the sides, the external surface corresponds above to the broad ligaments of the uterus and to the ureters, and below to a very great quantity of cellular tissue, which separates it from the levatores ani muscles, and in which the vessels of the uterus and bladder and the umbilical artery ramify, but particularly the vessels and the nerves of the organ which we are describing.

The internal surface is contiguous to itself. Its parietes are constantly covered with a more or less dense layer of mucus: farther, its dilatation is proportional to the frequency of coition, and the number of accouchments. We distinguish in it an anterior and a posterior longitudinal line: they are more apparent towards the vulva than towards the uterus; the first, which is always more prominent than the second, forms a large tubercle below the orifice of the urethra; we also distinguish there a great number of transverse wrinkles, which disappear on the sides, and which are much more prominent and more numerous near the vulva than near the uterus, where they seem to assume all directions: these transverse wrinkles are cut at a right angle by longitudinal ridges: be this as it may, all are formed by the mucous membrane which lines the vagina.

The upper extremity of the vagina presents a well marked fissure, which has the form of a crescent: it is attached around the upper part of the neck of the uterus, a little higher behind than before, so that this special union of the vagina to the neck gives rise to a cul-de-sac, which is very distinctly marked posteriorly. The wall of the vagina is very thin in this place; hence, in applying the forceps, the accoucheur should be very careful not to carry the blade of the instrument to this part, lest he should rupture it, and cause other serious accidents.

The lower extremity is continuous with the vulva, and at its deepest part slopes from above downward and from before backward.

The vagina is formed internally of a mucous membrane, which is evidently the continuation of that which lines the vulva, and which is continuous with that of the uterus; it is red, and the color of vermilion below: it becomes whitish or grayish above: it often presents posteriorly bluish or livid spots, which are more or less irregular. We also remark a great number of pores which are only the orifices of its lacunæ. This membrane becomes thinner successively in going from the vulva to the neck of the uterus: finally, it is covered, in its whole extent, with a very distinct epidermis, with an erectile spongy tissue, which forms on the outside, near its lower extremity, a layer an inch broad, and from two to three lines thick: its texture is dense and compact, its color grayish or bluish. This tissue becomes much thinner above; it however re-ascends to the uterus, and seems to be continuous with the proper tissue of the womb: this tissue is commonly termed the retiform plexus. Finally, a small circular fasciculus is formed by some muscular fibres, on

the outside of the spongy tissue just mentioned: this is the constrictor vaginæ muscle, which also receives vessels and nerves: the former come from the hypogastric vessels, the latter are given off by the sciatic plexus. (*See the successive plates.*)

UTERUS AND ITS APPENDAGES.

The description of the uterus and its appendages completes the history of the genital organs of the female. The appendages are first, the broad ligament which encloses the uterine or Fallopian tube in the anterior segment, and in the posterior the ovary and its ligament: second, the round ligament.

Uterus. The uterus is a hollow viscus, situated in the cavity of the smaller pelvis, between the bladder and the rectum, above the vagina, and below the circumvolutions of the small intestine. Its figure is conical, resembling a pear flattened on its two opposite faces, more prominent posteriorly than anteriorly, rounded at its base, and truncated at its summit. Its entire length is three inches; it is two inches broad at its upper part, while its breadth at the lower part is only one; it is about one inch thick.

We distinguish in the uterus a base, a body, a neck, and a cavity; the base is that portion of the uterus which rises above the insertion of the tubes, and is only a few lines high: its form is rounded, and it is covered in its whole extent by a prolongation of the peritoneum. The body is the largest part of the uterus, and includes that portion of the organ extending from its base to its neck: its form is that of a triangle, the upper two angles of which correspond to

the insertion of the tubes, which communicate, in this place, with the cavity of the uterus. The lower angle blends with the neck. Externally, the anterior and posterior faces of the body of the uterus are covered in great part by a prolongation of the peritoneum: internally, these two faces form the parietes of its cavity.

The neck of the uterus is the elongated portion seen below the body; it passes into the vagina, and occupies its upper part: it is from ten to twelve lines long, from six to eight lines thick from before backward, and from eight to ten broad: it is cylindrical, compressed from before backward, and slightly enlarged at its central portion: it communicates in the cavity of the uterus by an opening termed the upper, internal or uterine orifice. The corresponding extremity in the vagina forms a prominent part, perforated in the centre by an opening which is termed the external, inferior, or vaginal orifice. This opening is transversely elongated and closed perfectly, in females who have borne no children; but it becomes rounded and sloping in those who are mothers. It is bounded by two rounded lips; of these the anterior is thicker, the posterior thinner: this opening is termed by authors, the *os tincæ:* the neck is encircled in its whole extent by a cavity which is more contracted at its two extremities, and a little broader at its centre. (*See Pl. XIII. Fig.* 2.)

The cavity of the uterus is flat and triangular; it is not very extensive, and is scarcely large enough to admit a small bean: the upper two angles present the very narrow orifices of the Fallopian tubes, the lower angle communicates with the cavity of the neck. (*See Pl. XIII. Fig.* 1.) Sometimes this opening is divided by a perfect septum; hence the possibility of superfetation, several cases of

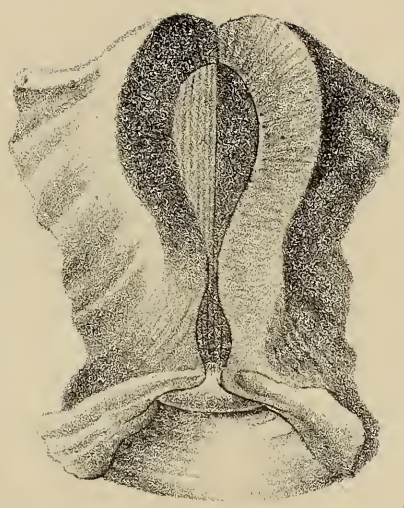


Fig. 1.

Double Uterus.

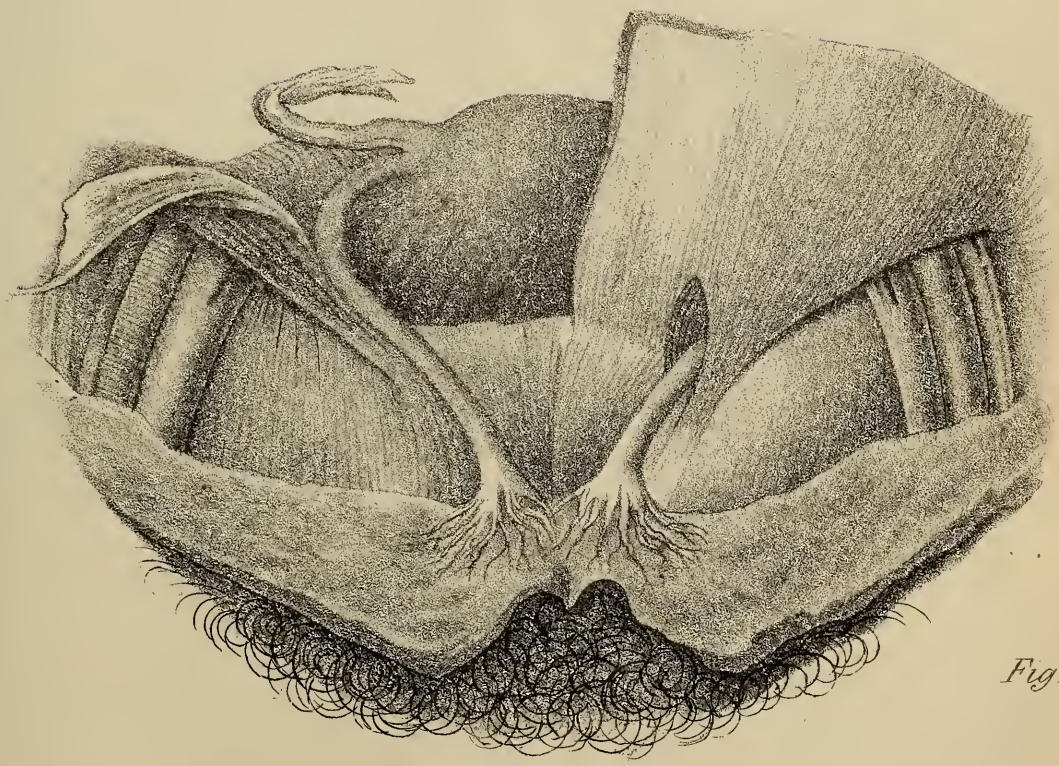


Fig. 2.

View of the Round Ligaments.

Lithographed by A. Imbert, N.Y.

15 days.

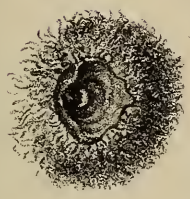


Fig. 1.

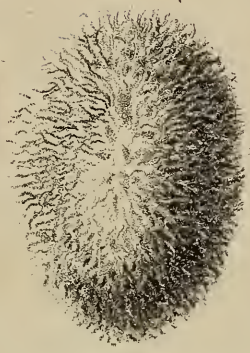


Fig. 2.

21 days.

Fig. 3.

45 days.

Fig. 4.

2 months.

Fig. 5.

3 months.

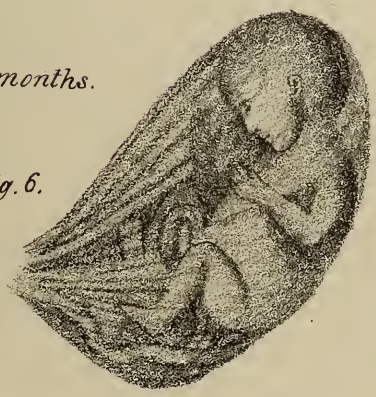


Fig. 6.

4 months.

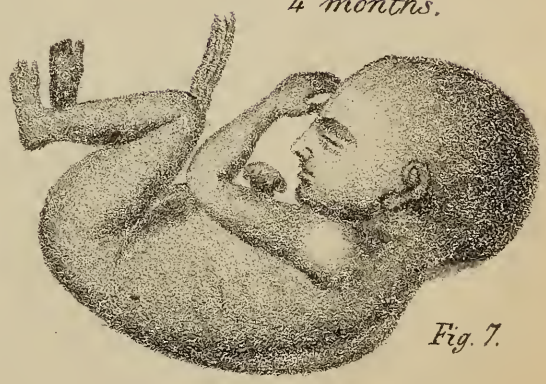


Fig. 7.

5 months.

Fig. 8.

PLXVII

Fig 1.

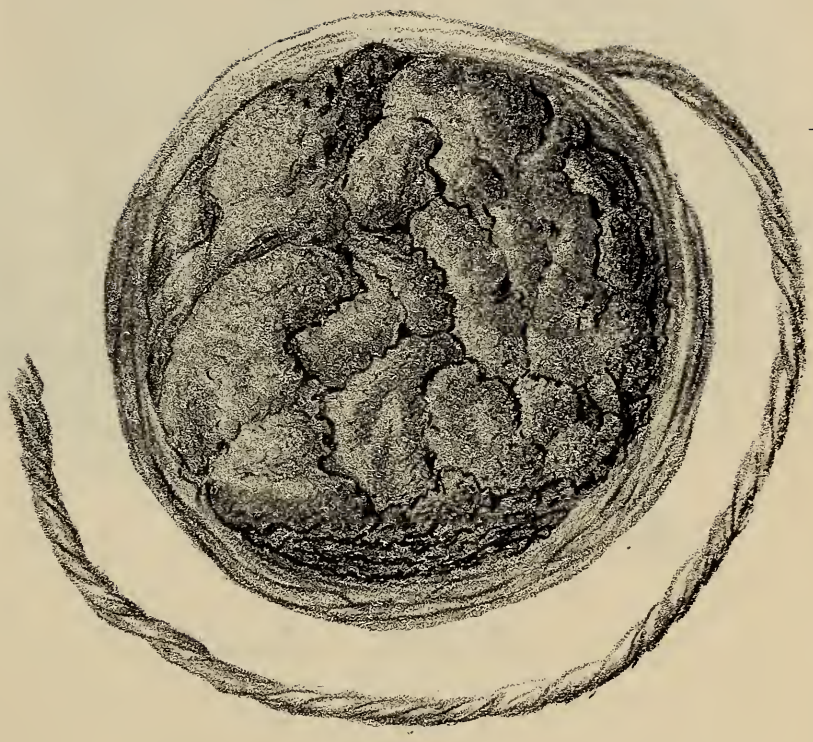
7 Months

Fig 2.

9 Months

PL. XIX

Fig 1.



Uterine Face.

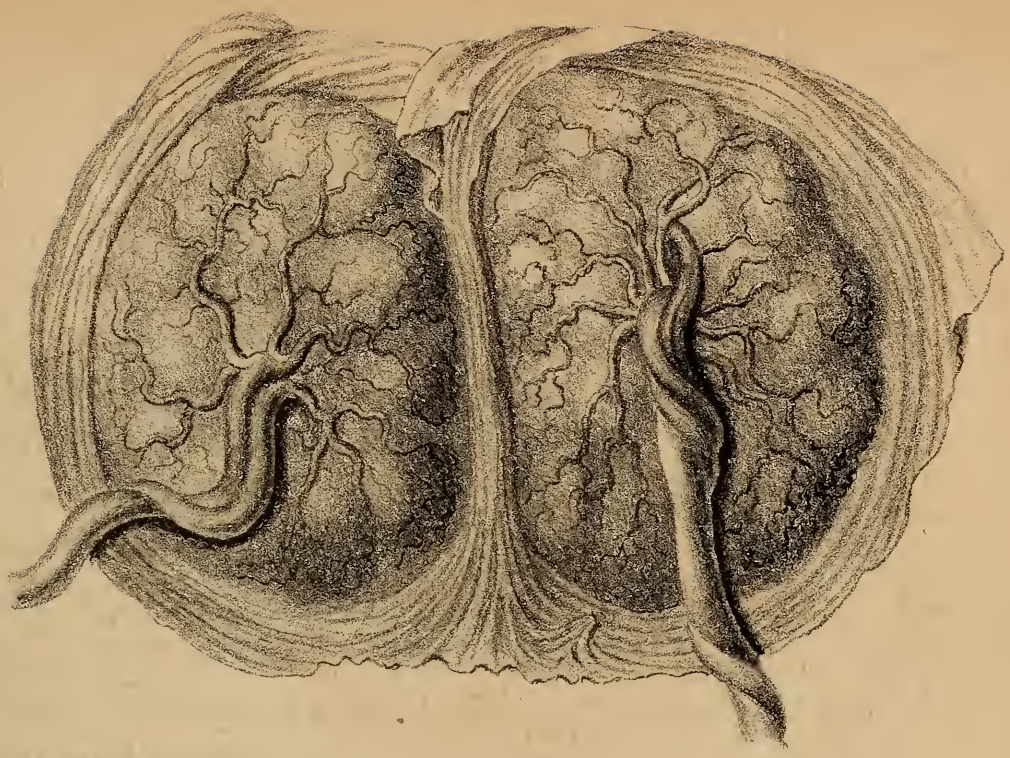
Placenta.

Fig 2.

Fetal Face.

J. Bisbee del. & lith. N.Y.

Fig. 1.



Double Placenta.

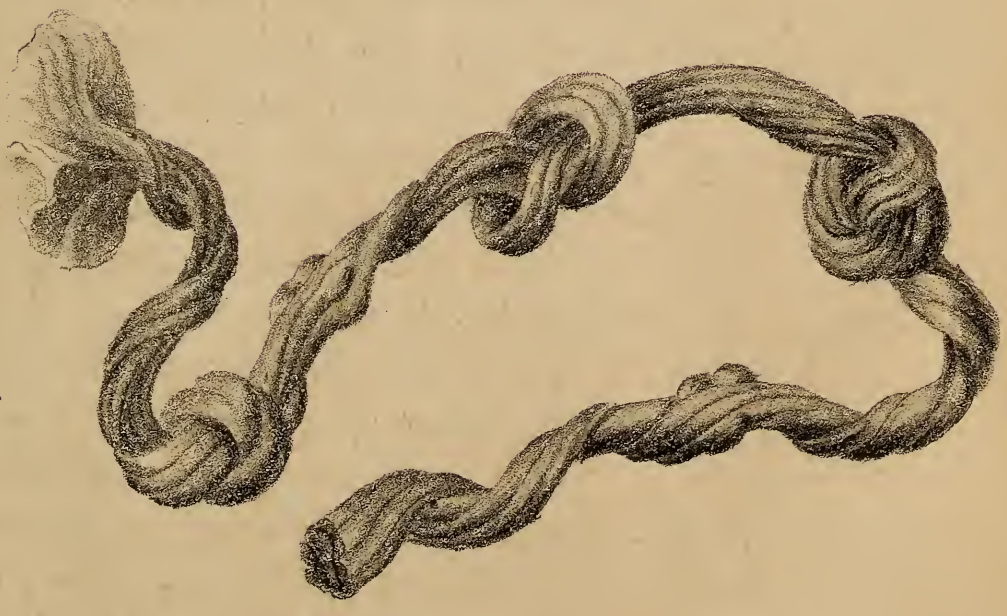


Fig. 2.

Umbilical cord.

Drawn & Lith. by D.G. Johnson N.Y.

which are known. Fig. 1. Pl. XVI. presents an instance of this kind, which we detected in an uterus brought to the lecture-room for our lectures on obstetrics.

The uterus presents externally a serous membrane, a prolongation of the peritoneum, which covers its upper three-fourths: internally, it seems formed by a continuation of the mucous membrane which lines the vagina. Professor Chaussier doubts the existence of this membrane: the reasons with which he supports his opinion appear unanswerable. This learned physiologist says, that a simple accidental coagulated concretion, has been mistaken for the mucous membrane of the uterus; but this membrane possesses none of the characters of the mucous membrane which lines the vagina. (*See his letter to Mad. Bocvin.*) The proper tissue of the uterus, then, is that portion of this organ which is under the serous membrane: this tissue is dense, elastic, and grayish white: its density increases near the neck, where its grayish tint diminishes: the arrangement of its component fibres cannot be distinguished in any part; and it would be difficult, by examining this tissue in the natural state, to form an idea of the changes produced in it by pregnancy.

The arteries of the uterus are given off by the hypogastric arteries: they are tortuous and small, while the organ is inactive; but they often enlarge during pregnancy: the veins accompany the arteries.

The lymphatic vessels of the arteries are so numerous, and their dilatation during pregnancy is so remarkable, that we should be led to believe the uterus to be formed by them entirely; they come from the hypogastric plexuses.

APPENDAGES OF THE UTERUS.

The peritoneal membrane, after enveloping the upper three-fourths of the uterus, forms before and behind this organ some slight folds which are termed its anterior and posterior ligaments: it is reflected also on its sides, and forms there a broad fold, termed the broad ligament, which incloses the Fallopian tubes, and the ovaries.

Fallopian tubes. These are cylindrical canals, which extend from the upper angles of the uterus, with which they communicate, to the sides of the superior or abdominal strait; they are about five inches long. Of the two extremities of the tube, the internal, which is very small, passes through the tissue of the uterus, and opens into the cavity of this organ by an opening so narrow as hardly to admit a bristle; the external extremity is termed the infundibulum, or the fimbriated extremity: it is loose, and fringed, and is generally inclined toward the ovary, to which it is attached by one of its longest fringes. Although it is not easy, generally, to show the duct of the tube, yet this can be accomplished by a little patience and skill. (*See Pl. XV. Fig.* 1.)

The tubes are composed of a common external membrane, which passes to them from the peritoneum, and of two special membranes, an external and an internal: the external is thicker, denser, whitish, and contractile, although we cannot discover in it any muscular fibres: the internal is thinner and softer, and seems to belong to the mucous membranes: near the fimbriated extremity is a small portion of spongy tissue.

The vessels of the Fallopian tubes come from the hypogastric vessels.

Ovaries. These parenchymatous organs are vascular, oval, and slightly compressed on their two opposite faces; their color is a pale red; they are rather dense, about the size of a small pigeon's egg, and are situated in the posterior folds of the broad ligament.

In the ovaries we distinguish two extremities; one is external, in which one of the principal fringes of the Fallopian tube is inserted, by which the Fallopian tube is brought upon the ovary, which it embraces in almost its whole extent, at the moment the ovum is impregnated: the internal extremity is continuous with a thin fibro-vascular cord, which terminates in the substance of the uterus, behind but a little below the insertion of the tube: this cord is termed the *ligament of the ovary;* it is situated like the latter organ, in the broad ligament, and occupies its posterior wing: it is solid, and presents no trace of a duct. (*See Pl. XII. Fig.* 1.)

The ovaries present on their surface rounded prominences, separated by slight grooves: we sometimes observe in them small cicatrices or wrinkles, in young females who have borne children. (*See Pl. XV. Fig.* 3.)

The peritoneum directly covers the whole external surface of the ovaries, except at the place where they adhere to the broad ligament.

It is difficult to determine the nature of the parenchyma of which the ovary is formed: however, when this body is ruptured, or divided longitudinally (*see Pl. XV. Fig.* 4), we observe from fifteen to twenty cellular, vascular lobules and small rounded vesicles, the size of a grain of wheat: these vesicles are filled with a colorless or yellow albumi-

nous fluid; this may be seen better by dividing them carefully with the point of a pair of small scissors.

The ovaries receive their vessels from the spermatic vessels; their nerves are very small, and come from the renal plexuses; the lymphatic vessels communicate with those of the kidneys.

Round Ligaments. These are cellulo-vascular cords, which extend from the uterus to the internal and upper part of the thighs: they come from the sides and the anterior and superior parts of the uterus, before and below the insertion of the tubes, and thence proceed from below upward, and from within outward, towards the inguinal ring, through which they pass, immediately expand, and terminate in the cellular tissue of the groins, the clitoris, and the external labia. (*See Pl. XVI. Fig.* 2.)

These cords are whitish and dense, slightly flattened, and thinner at their centre than at their extremities: they are composed of filamentous cellular tissue, of blood vessels, and of lymphatics: their uses are unknown: towards the middle of gestation, however, they sometimes swell, become painful, and thus take part in that species of general turgescence, with which the pregnant female is at this time affected.

GLANCE AT THE CHANGES IN EACH OF THE PARTS COMPOSING THE GENITAL ORGANS OF THE FEMALE, AT DIFFERENT PERIODS OF HER LIFE, AND AT THEIR USES.

The end proposed by nature in the composition and the order of the development of the female organs of generation, cannot be mistaken: these organs are in a measure

useless for the support of the life of the individual during infancy and childhood, and are then remarkable only for their extreme smallness: as the cavity of the lower pelvis is very much contracted at the moment of birth, and during the first ten or twelve years, they are situated principally in the abdomen: the external labia scarcely exist; the internal labia alone present a development which might deceive, if we did not remember that this circumstance is common in all females at the moment of birth: the vagina is short and very narrow.

The uterus, which at the birth of the child is situated out of the cavity of the pelvis, is found on a level with the last lumbar vertebra: its body is not large, and is narrow, thin, and elongated: its cavity is extremely small: finally, the uterus increases but very slowly, until the period of puberty; but at this time it enlarges very much, as do the ovaries, and becomes the seat of a very active nutrition: its vessels are dilated, it receives a greater quantity of blood, and its internal surface assumes a reddish tint, which indicates the proximate occurrence of menstruation: finally, it assumes its permanent size, and descends entirely into the cavity of the pelvis.

We shall not mention in this place the changes which occur in the uterus during gestation: they will be stated hereafter, when treating on pregnancy. After the turn of life, and in aged females, the uterus becomes smaller; its internal surface gradually loses the reddish tint presented by it since the menstrual discharge was established, and it becomes white, as before the period of puberty. Finally, the neck is more deformed in those females who have borne several children, and deep lacerations are often seen in it.

The appendages of the uterus are developed in the same

THE FETUS AND ITS APPENDAGES,

CONSIDERED IN THEIR RELATIONS WITH THE HISTORY OF PREGNANCY,

AND

THE PRACTICAL SCIENCE OF OBSTETRICS.

The history of the fetus includes, 1st, its development; 2d, that of its appendages; 3d, its nutrition and circulation; 4th, its general and special division.

I. DEVELOPMENT OF THE FETUS.

We see nothing in the uterus previous to the seventh day, to indicate the presence of a new being.

At the eighth day, there is a mucilaginous film, and some transparent filaments.

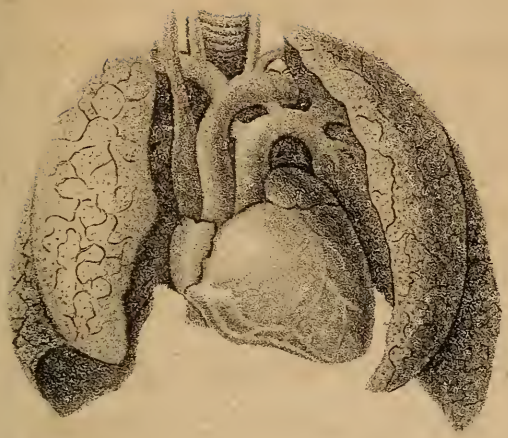
At the tenth day, a grayish, semi-transparent floccula, the form of which cannot be determined.

From the twelfth to the thirteenth day, there is a vesicle as large as a pea, containing a thick fluid, in the midst of which swims an opaque point (*punctum saliens*). It is thought that the heart alone exists at this period, and this also is the first lineament of the child, which is now termed the embryo. It is enveloped by the chorion and the amnios. Its weight is estimated at one grain.

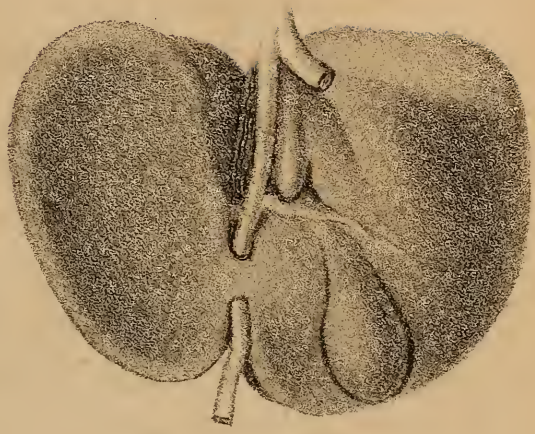
FETAL CIRCULATION.

PL XXI

Fig 2.



Arterial Canal



Venous Canal

Fig 3

Foramen of Botal

Fig 4

Umbilical Arteries

E. Bisbee del & lith. NY

Skeleton of the Fœtus

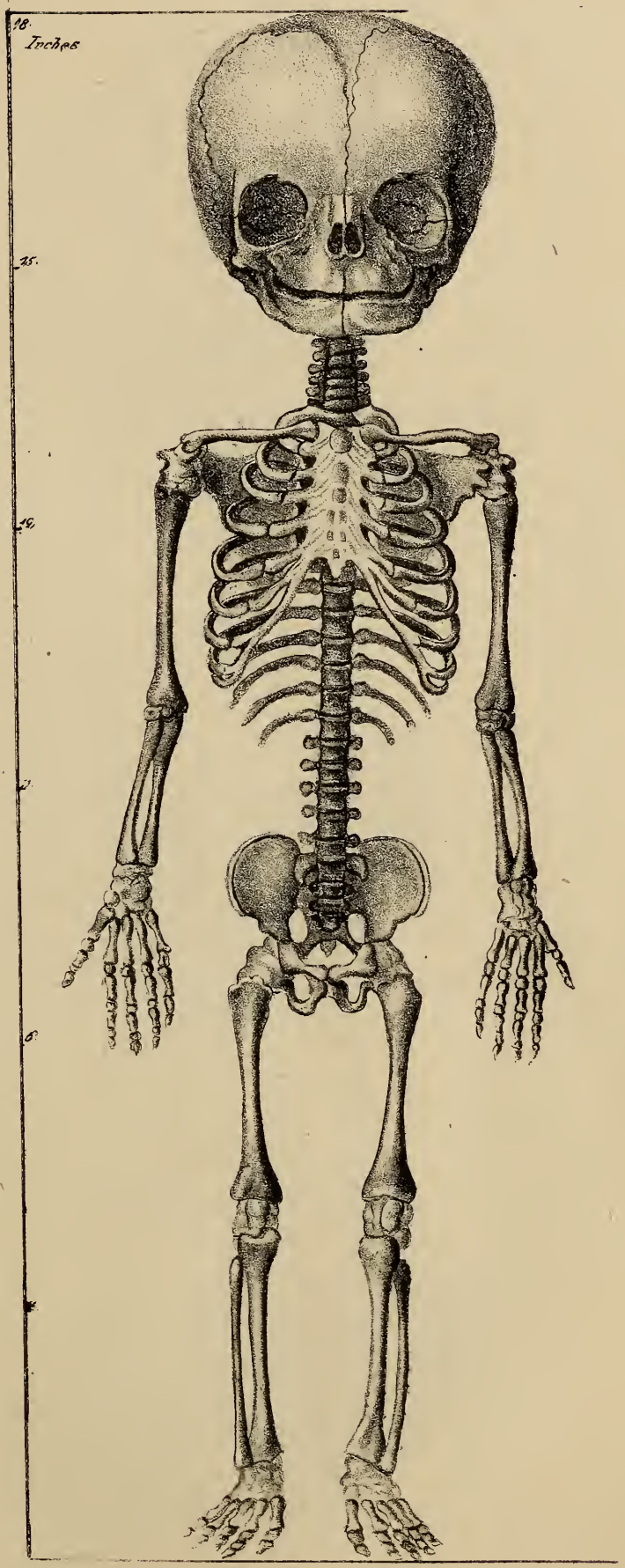


Fig. 1.

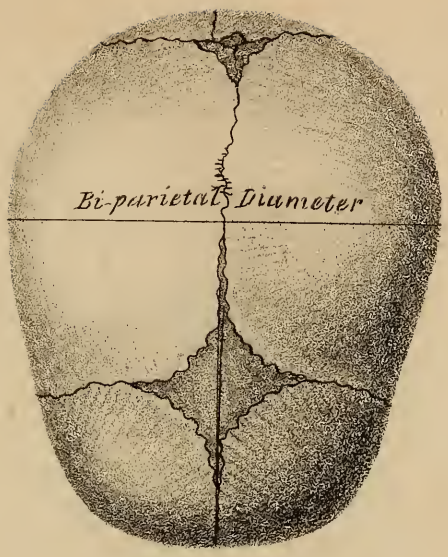


Fig. 2.

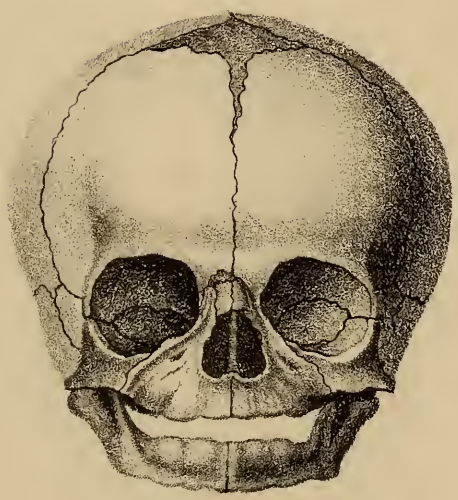
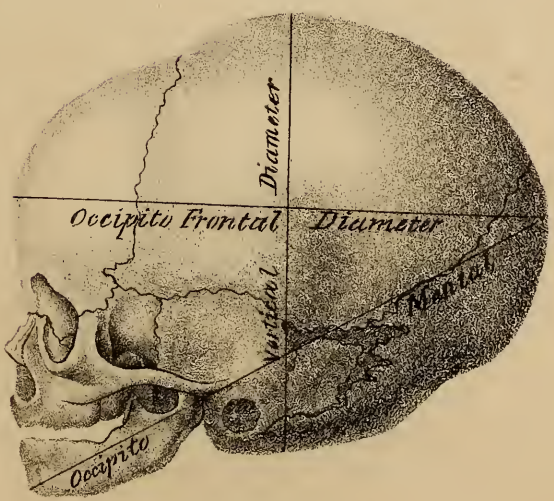


Fig. 3.



Drawn & Lith.d by D.G. Johnson N. Y.

Fig. 1.

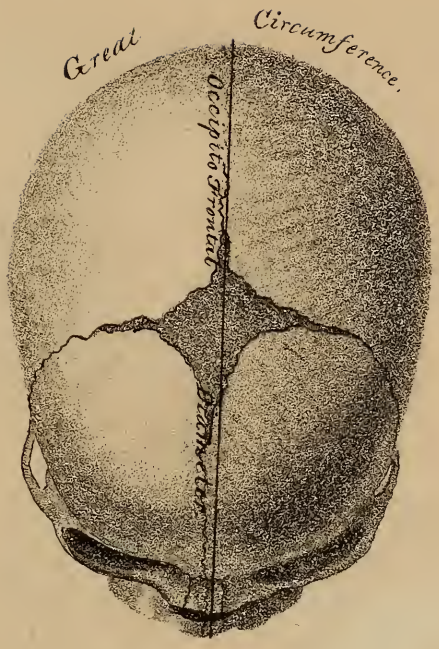


Fig. 2.

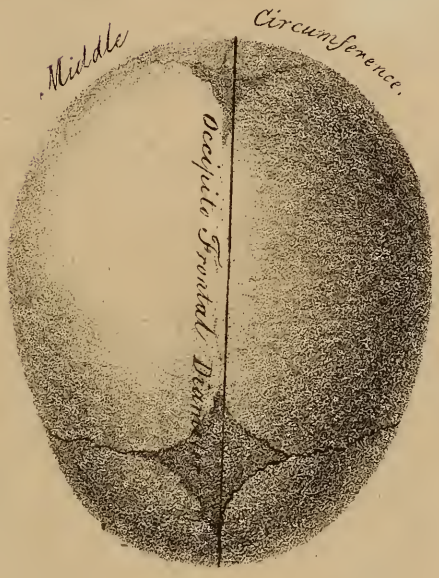
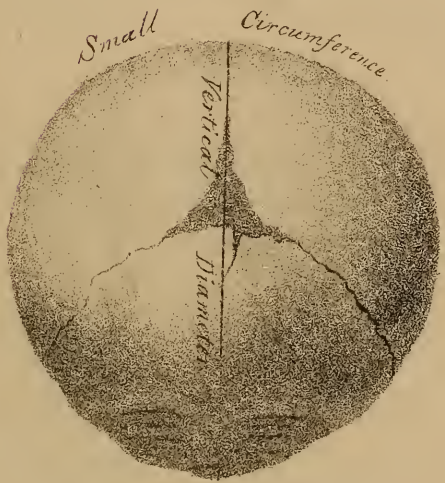
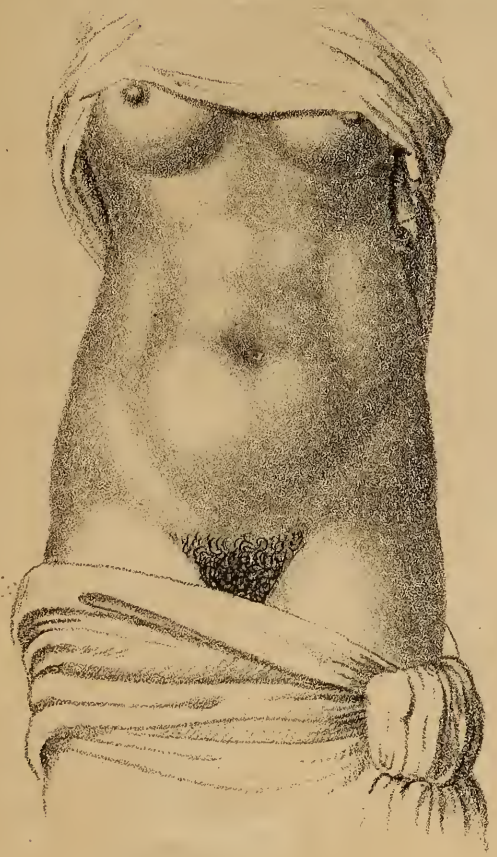


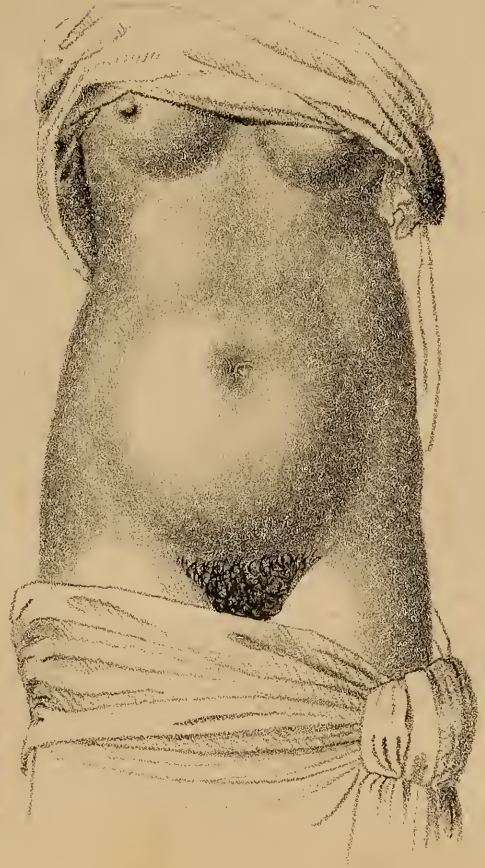
Fig. 3.



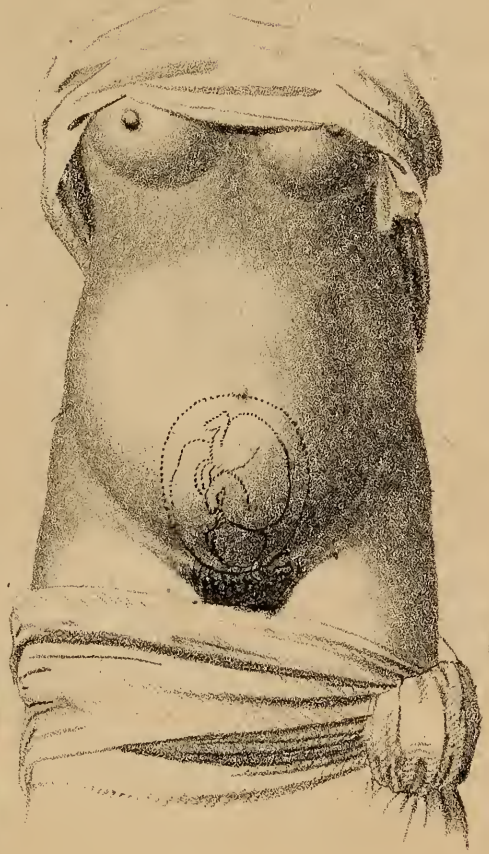
Natural State
Fig. 1.



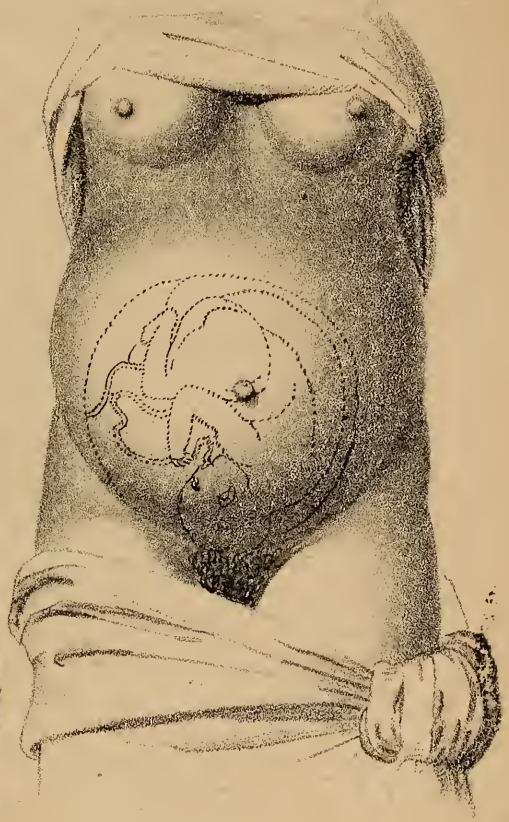
3. Months.
Fig. 2.



6. Months.
Fig. 3.



9. Months
Fig. 4.



Lith. of Johnson

At the twenty-first day, the embryo appears in the form of a large ant (*Aristotle*), of a grain of wheat (*Burton*), of the malleus (*Beaudeloque*): it weighs from three to four grains, and is from four to five lines long. At this time, the different parts of the fetus are rather more consistent: and those parts which afterwards become bones, now pass to the state of cartilage. (*See Pl. XVII. Fig.* 1.)

At the thirtieth day, the fetus resembles a worm which is compressed and bent upon itself. We observe at this period, some very faint traces of the principal organs, and of the situation of the upper extremities. It weighs from nine to ten grains, and its length is from ten to twelve lines.

At the forty-fifth day, the form of the child is very distinct, and it is now termed the fetus. The clavicles and the scapulæ, hitherto cartilaginous, now begin to ossify: the limbs appear in the form of tubercles, resembling the sprouts of vegetables. The body lengthens, but preserves its oval figure: the head, which is larger, constitutes one of its extremities: the base of the trunk, which is pointed and elongated, forms the other. The eyes, mouth, and nose, are marked by blackish points and lines. Similar, and parallel points, correspond to the place of the vertebræ. Its weight is one drachm, its length is two inches. (*See Pl. XVII. Fig.* 2 *and* 3.)

At two months. All the parts of the fetus are present; the dark points which represent the eyes, enlarge; the eyelids may be traced, and appear very transparent: the nose begins to be prominent: the mouth enlarges and opens: the brain is soft and pulpy: the neck shows itself: the heart is very much developed, and opaque lines are seen to proceed from it, which are the first traces of the large

vessels. The fingers and toes are distinct. Its weight is five drachms, and its length four inches.

At ninety days (three months). All the essential parts of the fetus are perfectly formed and developed. The eyelids, although enlarged, are exactly closed: a small hole shows the place of the external ear: the back and the alæ of the nose are prominent: the lips are very distinct, and are in close contact, and the mouth is shut. The genital organs of both sexes also are now very much increased in size: the penis is very long, the scrotum empty; sometimes, however, it is filled and distended with a little water. The vulva is very apparent, and the clitoris is prominent. The brain, although still pulpy, is very much developed, as is also the spinal marrow. The heart pulsates strongly, and the principal vessels carry red blood. The lungs are empty, and hardly visible: the liver is very large, but soft and pulpy; it secretes but little bile. The whole of the upper and lower extremities are developed: the long bones of these limbs are evidently ossified, as are also the ribs, and the flat bones of the skull: finally, the muscular system begins to be marked. Weight, two and a half ounces; length, six inches. Intellectual functions undeveloped. (*See Pl. XVII. Fig.* 6.)

At one hundred and twenty days (four months). This period is remarkable for the great development, and the marked character of all the parts of the fetus. The head and the liver alone increase no longer, and constantly become less and less in proportion to the other parts. The brain and the spinal marrow become more consistent: a little meconium collects in the commencement of the intestinal canal: the muscular system is distinct, and the fetus moves slightly, but almost imperceptibly. We here and

there find some cellular tissue. Length, eight inches; weight, from seven to eight ounces. Intellectual functions undeveloped. (*See Pl. XVII. Fig.* 7.)

At one hundred and fifty days (five months). The development of all the parts of the fetus is not only greater, but at this period individual differences appear: the muscular system is very well marked, and the motions of the child are no longer equivocal: the lungs increase, and are capable of being dilated to a certain extent. The envelope of skin, although existing for a long time, becomes, especially at this period, very consistent: the epidermis is stronger and thicker: the meconium is more abundant, and descends in the intestinal canal: the places for the nails are marked out. Length, ten inches; weight, one pound. Intellectual functions, none. (*See Pl. XVII. Fig.* 8.)

At one hundred and eighty days (six months). At this period, the child may strictly be said to be in a measure viable: the nails may be distinguished: a little of down, the first indication of the hair, is seen on the head, the thymus gland exists, the meconium passes through a great portion of the intestinal canal, the testicles appear in the abdomen, and begin to move towards the inguinal ring: the cellular tissue is abundant, and a little adipose tissue is deposited in its cellules: the form of the whole child is distinct. Length, twelve inches; weight, two pounds. Intellectual functions undeveloped.

At two hundred and ten days (seven months). Every part of the fetus is enlarged: the child is perfectly viable: the nails are formed: the hairs of the head appear: the testicles descend into the scrotum. The child, if born at this period, can breathe, cry, and suck. The meconium descends into the large intestine, and the whole osseous

system of the skull, the ribs, and the limbs, is complete: the extremities of the long bones alone remain as epiphyses: the arterial canal enlarges: the pulmonary arteries, on the contrary, remain small. Length, fourteen inches; weight, three pounds. Intellectual functions undeveloped: the senses are alone susceptible of some impressions. (*See Pl. XVIII. Fig.* 1.)

At two hundred and forty days (eight months). Viability, growth of the fetus nearly terminated; each part assuming separately its strength and volume: the muscular system is very well marked. Length, sixteen inches; weight, four pounds. Intellectual functions undeveloped: the senses susceptible of impressions.

At two hundred and seventy days (nine months). The common and natural period of the birth of the child: the organs have then acquired all that is necessary to support life. (*See Pl. XVIII. Fig.* 2.)

The whole osseous system rapidly gains that degree of solidity proper for the functions which devolve upon it. The muscular system is very well marked, and the motions of the child are lively and quick: the heart pulsates quickly, the circulation is very active, the blood is abundant and rich in nutritious principles, the nervous system is very apparent: the lungs perform their functions, and respiration is established: great changes take place in the manner of the circulation: the whole alimentary canal, which hitherto had no special action, can immediately become active: the intestinal canal contracts upon the meconium, which tends to escape through the anus: the urine is excreted, the arterial capillaries of the skin become very active, the skin is colored, and transpiration is established. Length, eighteen to twenty inches; weight, five to six pounds. Intellectual

functions are undeveloped, but the senses (particularly the taste) are very much so. The child is sensible to pain, it cries from hunger and cold, it is appeased by warmth and nursing, and gentle rocking puts it to sleep.

II. DEVELOPMENT OF THE APPENDAGES OF THE FETUS.

The term *secundines* or *appendages* of the fetus, includes the several membranes which envelope it, the fluids they contain, the placenta, and the umbilical cord.

The fetus has three envelopes: the most external, is the *epichorion;* the middle, the *chorion;* and the internal, the *amnios.*

The *epichorion* appears when the uterus is first impregnated, and is seen in this organ even when pregnancy of the Fallopian tubes exists. This membrane is formed by the concrete lymph poured out by the exhalants of the uterus after impregnation, and appears in the form of a coagulated, whitish, albuminous, and very soft layer. Until about the second month of pregnancy, the epichorion is formed of a single layer: it may afterwards be divided into two distinct folds, the internal of which is the *reflected caducal* membrane of Hunter. At the end of pregnancy, the epichorion is separated from the uterus and remains entirely adherent to the external face of the chorion, from which it may easily be detached at parturition.

The *chorion* is the first and the most external membrane of the fetus. Its external face looks toward the epichorion, its internal face to the amnios. It is thicker in the early stages of pregnancy, but becomes thinner as the period of parturition approaches. Between the second and third

month of gestation, these vascular, whitish flocculœ are developed upon a part of its uterine surface, which are designed to form the placenta which Haller considers only an indurated portion of the chorion.

The chorion serves to unite the ovum with the uterus, contributes to form the placenta, sustains the amnios, and transmits to this membrane the minute and colorless vessels which pour into its cavity the liquid which supports the fetus.

The *amnios* is the second, or rather the proper membrane of the fetus, which it covers and supports: it supplies and holds the waters in which the fetus is situated. The amnios is transparent, diaphanous, and a little thicker than the chorion. Its external face corresponds to this latter membrane, to which it adheres slightly, by means of a great number of minute colorless vessels, which are easily ruptured after parturition. Its internal face looks toward the fetus, and is in direct contact with the waters. (*See Pl. XVII. Fig.* 8.)

The uses of the amnios are to contain the ovum, and to secrete the waters in which it is situated. The chorion and the amnios, beside their special uses, serve also to sustain the weight of the waters during labor, and thus to facilitate the dilatation of the neck of the uterus.

The history of the membranes is naturally followed by that of the waters they contain. These are termed the waters of the amnios, or the amniotic fluid. These waters are generally clear, limpid, diaphanous, tasteless, and colorless: sometimes, however, they are turbid, muddy, often grayish, brownish, and extremely fetid towards the end of pregnancy, though the fetus exhibits no manifest alteration.

The waters, compared with the size of the sac which contains them, are more abundant at the commencement than at the end of pregnancy.

The most general opinion in regard to their formation and nature is, that they come from the mother, and are supplied by the exhalants of the uterus, which transmits them through the anastomoses of the placenta to the capillary vessels of the chorion, whence they pass through the pores of the amnios, and filtrate, like fine dew, into the cavity of this membrane.

The waters have several important uses. They serve to sustain the fetus and to preserve it from the fatiguing efforts of the mother; at a later period they facilitate the dilatation of the uterus, and especially that of the neck, at the moment of parturition.

PLACENTA.

In the latter periods of pregnancy, the placenta is a spongy, cellular, vascular mass, most commonly circular and flattened, an inch thick in the centre, thinner on the circumference, and from seven to eight inches broad: its weight, together with its membranes and the umbilical cord, is generally twelve ounces.

It presents an external, *uterine*, convex, lobular face, which intimately adheres to the uterus during the whole of pregnancy: the opposite face, the internal, *fetal* or *umbilical*, presents numerous divisions of the umbilical vessels. It is directly covered by the chorion.

The placenta is attached most commonly to the posterior or superior face of the uterus. Sometimes, however, we

find it on its sides; sometimes, also, but more rarely, toward the orifice, and even directly over the os tincœ.

The umbilical cord is generally inserted near the centre of the placenta; when the attachment occurs in any part of its circumference, the placenta is termed *en raquette.* The placenta is formed of several lobes or cotyledons; these are easily distinguished on its uterine surface, but are united in one mass on its fetal face.

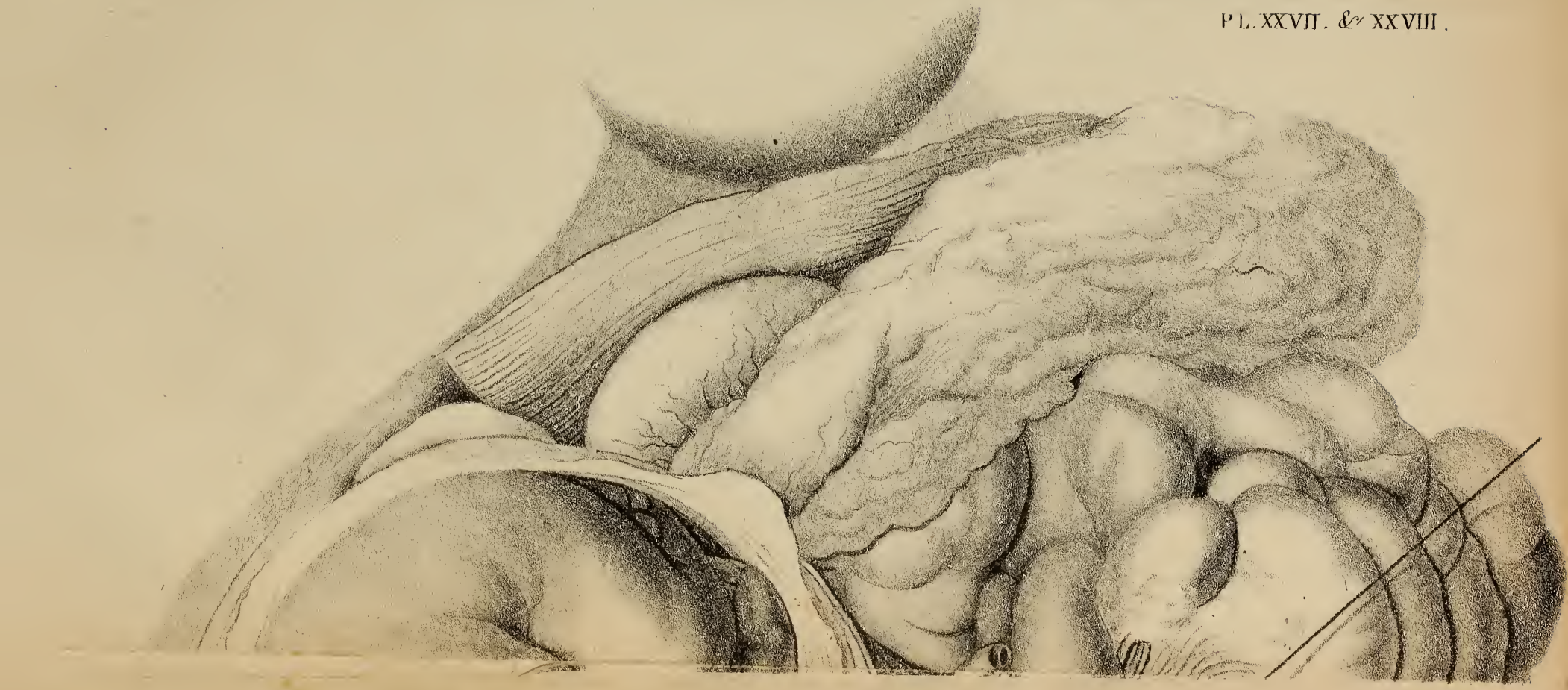
The parenchyma of this organ is easily torn: its color is dark red. It is composed of blood vessels, cellular tissue, and whitish, dense, resisting filaments; the latter are more numerous and more apparent at the end of pregnancy, and seem to be only the obliterated branches of the vessels. (*See Pl. XIX. Fig.* 1 *and* 2.)

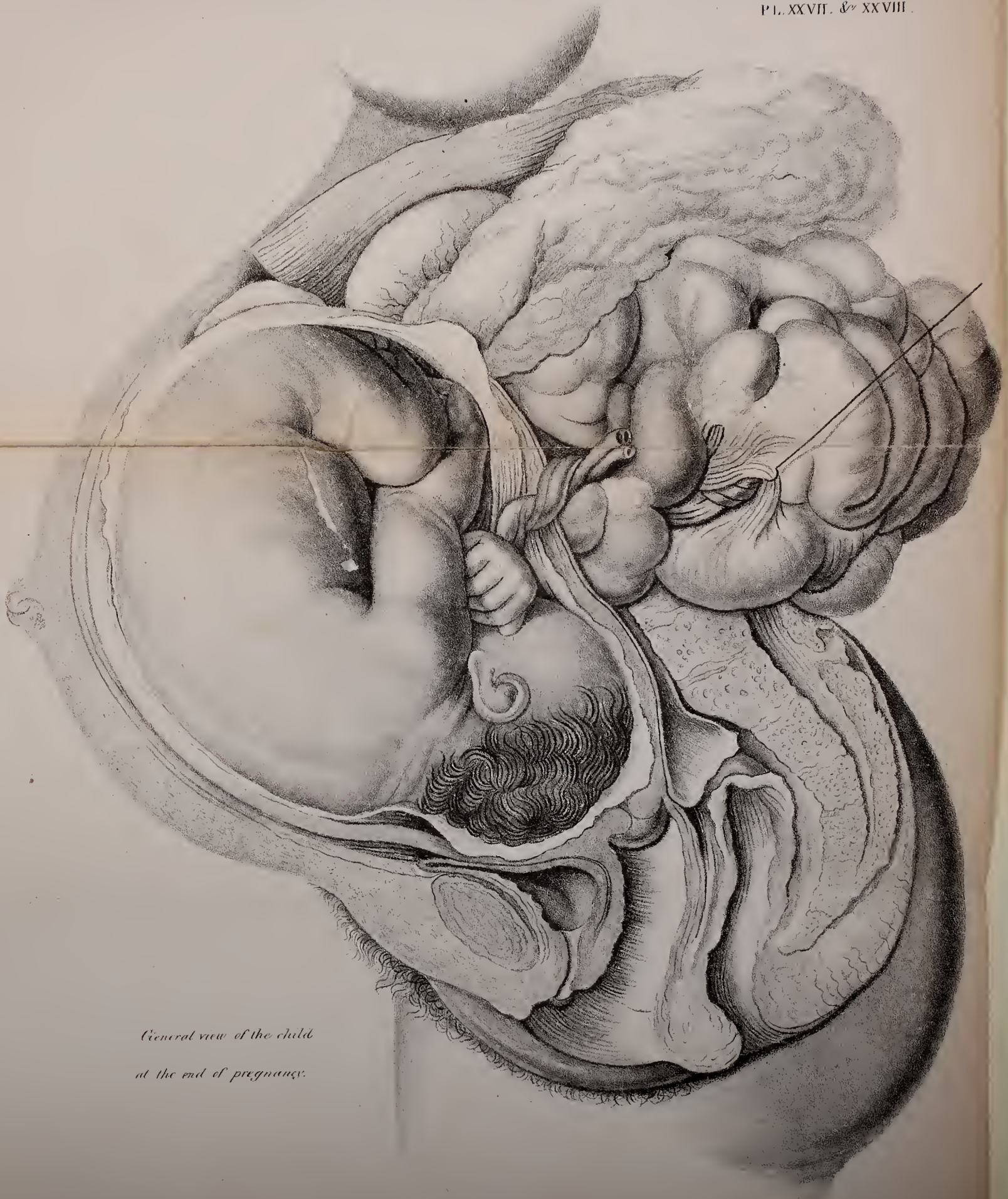
Every fetus has a placenta: in a twin pregnancy, however, the two placentas are sometimes united at their edges, but the circulation for each child is distinct, although anastomoses between their vessels may be demonstrated. (*See Pl. XX. Fig.* 1.)

UMBILICAL CORD.

The umbilical cord is a vascular fasciculus, which extends from the placenta to the umbilicus of the child. It is very short at the beginning of pregnancy, and is formed at this time by the omphalo-mesenteric vessels, by the umbilical arteries and veins, and by these latter alone at the end of pregnancy. Its length is commonly from eighteen to twenty-four inches; but not unfrequently it is much longer or much shorter: in the latter case, knots may be formed in one or more parts of its extent.

PL. XXVII. & XXVIII.





General view of the child

at the end of pregnancy.

All cords are not similar: we distinguish those which are large, thin, short, varicose, or knotty: the large are not generally the firmest; and we can depend most upon the thin cords when it is necessary to pull upon them in order to deliver the placenta. (*See Pl. XX. Fig.* 2.)

NUTRITION AND CIRCULATION OF THE FETUS.

Nutrition. It is an incontestable fact, that the fetus is nourished by the fluids derived from the mother; but it is not equally easy to demonstrate by what mode and in what manner these fluids come to it. Physicians differ much upon this great physiological question. In fact, some assert, that the infant is nourished by sucking the waters in which it is inclosed, and that these fluids, on entering the stomach, are subjected to the common laws of digestion, and thus become the elements of the nutrition of the fetus. But experiments made on the waters of the amnios have demonstrated, that they contain but little, or rather no nutritious substance: that at the end of pregnancy particularly, they are often turbid, blackish, purulent, &c.: it has also been observed, that the membranes are sometimes ruptured for several days, a month even before the commencement of real labor, which would necessarily cause the premature discharge of the waters of the amnios, long before that of the child: finally, it is certain that some children have been born with the mouth imperforate, and consequently it was physically impossible for them to receive any of the amniotic fluid.

The reasons adduced in support of the opinion we have mentioned, also deserve to be answered. It is asserted,

that the child, by sucking the waters of the amnios, prepares for the more complex and more difficult operation of sucking the mother. We must admit, that this propensity of the new born child, and the power of exercising it at birth, are phenomena as astonishing as they are inexplicable; but how is it that the young duck, when hatched out by a hen, as soon as it emerges from the shell, plunges into the water, regardless of the cries of its mother, while the chicken of the same brood avoids this element? Besides, there is nothing on the inside of the amnios resembling the nipple, which might be sucked by the fetus, and therefore its propensity at the moment of birth is innate, and not an acquired faculty.

On the other hand, the opinion which tends to demonstrate that the fetus is nourished by intussusception, or by absorption, cannot be admitted. The cutaneous system of the fetus is inactive as long as it continues in the uterus, and the waters have neither the properties nor the qualities proper for absorption.

Those physiologists who have attempted to explain the nutrition of the fetus, may have erred by confounding this nutrition with proper digestion, wishing to establish an analogy between this imaginary digestion of the fetus and that of the adult; they have maintained that the nutritious juices should follow the same course, and pass through the same passages in both; not thinking that one lives in a light, elastic, æriform fluid, that it enjoys fully an active respiration, and all the advantages of a rich and abundant circulation, while the other rests in the midst of the uterus, surrounded by a thick and incompressible liquid, has no respiration, and only as it were a vegetative life, and an imperfect existence. All these reasons, and as many

more, which are superfluous, should lead us to reject both the theory of deglutition, and that of absorption, as the only modes in which the fetus is nourished. The fetus, then, must be considered during the whole of pregnancy, as a new part, added for a time to the female, which part is nourished through the common and known medium of the circulation. The child then receives the fluids necessary for its growth through the umbilical cord, and does not subsist upon the waters of the amnios.

Circulation of the fetus. If the circulation in the fetus were the same as in the adult, we should omit it; but it differs in several respects, and therefore requires a particular description.

As the fetus has no organs to perform the hematosis, since the lungs are inactive till the moment of birth, it is necessary for the mother to furnish, already prepared, the fluids which, as soon even as they are carried into the circulation, become the elements of its nutrition. This function belongs to the umbilical vein.

This vein arises in the placenta, goes toward the umbilicus of the child, and, without communicating with the umbilical arteries, penetrates into the abdomen. Being sustained by a fold of the peritoneum, it is directed from before backward, and from below upward, toward the upper part of the great fissure of the liver. There it gives off a large and short twig, a kind of sinus destined for the liver, into which it penetrates after dividing into two branches, one for the right lobe, the other for the left. (*See Pl. XXI. Fig.* 2.)

The umbilical vein then becomes very small, and goes under the name of the *venous canal* towards the right

auricle of the heart, into which it penetrates, blended with the ascending vena-cava. The blood which comes to the heart through this latter, is separated by the Eustachian valve from the current formed by the descending vena-cava. Being sent forth in a different direction, it strikes against the septum of the auricles, passes through the foramen ovale or the foramen of Botal, and raises its valve, which being on the side of the left auricle, does not permit the blood to repass into the right auricle.

Arrived in the left auricle, the blood is transmitted into the left ventricle, and from thence into the ascending aorta, at least in great part: after passing through the head and the thoracic extremities, it is carried by the descending vena-cava into the right auricle, which sends it into the right ventricle, and from thence it passes into the trunk of the pulmonary artery. A small portion of the blood which is transmitted through this artery, goes to the lungs, which being collapsed and inactive, cannot receive more of it. Most of it passes into the descending aorta, by the arterial canal, (*See Pl. XXI. Fig.* 2), and after proceeding through the whole extent of this latter, returns to the mother through the umbilical arteries. (*See Pl. XXI. Fig.* 4.)

The following are the most remarkable changes in the circulation of the fetus at the moment of birth.

As soon as the air enters the lungs of the new born child, and respiration is established, the blood which is then brought into relation with the vesicles of air, immediately experiences the most remarkable changes, and instead of black, suddenly becomes red and very light. This blood returns for the first time through the pulmonary veins into

the left auricle, depresses the valve of the foramen ovale, and thus opposes the transmission of that which, during the whole of pregnancy, arrived through the right auricle: carried into the left ventricle, and thence into the aorta, it passes through the whole extent of this vessel, and effaces the communication between this latter and the pulmonary artery, by means of the arterial canal which collapses and is finally obliterated. The column of blood which passes through the lower part of the aorta, when arrived at its place of bifurcation, no longer passes through the umbilical arteries, but is sent into the iliacs and thus goes abundantly into the lower extremities.

In consequence of the depression of the valve of the foramen of Botal, the blood which returns from the lower parts, being carried into the right auricle through the ascending vena-cava, mixes for the first time with that which comes from the upper extremities, returned into the same by the descending vena-cava. The blood, when transmitted from the right auricle into the ventricle of the same side, is sent into the lungs through the pulmonary artery, and the arterial canal is gradually obliterated.

We terminate the anatomical and physiological history of the fetus by a word upon its length, weight, situation, and motions.

The length of a full-grown child is generally from eighteen to twenty-one inches; its weight varies more, and is from five to seven pounds. When less than five pounds, the child is delicate, feeble, or sick, and cannot always be expected to live; when its weight is more than seven pounds, and eight, nine, or even ten pounds, it is unusually large: its delivery is generally laborious, and sometimes

even impossible by natural means, and often requires the assistance of art.

The position of the fetus in the mother is absolute or relative. The absolute position results from the special manner in which the different parts of the infant are arranged when compared with itself: in most cases, it is bent upon itself, the head being flexed on the chest, the arms crossed and supported on the thorax, the thighs bent upon the abdomen, the legs on the thighs, and the heels on a level with the thighs. In this bent up position, it represents an oval figure, the greatest diameter of which, from the occiput to the heels, is from nine to ten inches.

The relative position of the fetus is only its peculiar situation in the uterus, at different periods of pregnancy. The ancients had very singular ideas on this subject: they asserted, that during the first seven months of pregnancy, the fetus rested on the vertebral column, the head upward, the thighs downward, and that at the seventh month, it made what they termed a somerset. This old error is no longer tenable. In fact, touching demonstrates, that in most pregnant females, the child's head rests near the neck of the uterus, long before the seventh month, and that it is found there even at the fifth. (For the situation of the fetus, *see Pl. XVII. and XVIII.*) This situation, however, varies in several ways, as is proved by those labors in which the fetus presents successively the feet, the thighs, or some other part, the presence of which being an insurmountable obstacle to the natural termination of the labor, requires the employment of more or less laborious means to obtain it. This will be mentioned hereafter, when describing the manœuvre.

The motions of the fetus are spontaneous or active, com-

municated or passive. The active motions depend on the action of its muscles, and are manifested as soon as this action can be brought into play. Usually, they begin to be felt about the middle of the fourth month of pregnancy, and are at first very feeble: they then increase, and sometimes become so active and quick, as to incommode the mother very much. These active motions prove to her that the child is living.

The passive or communicated motions are those which may be caused by different positions of the female. By touching, certain special motions are impressed on it, which are termed *ballottement*, and which may strictly be made perceptible from the fifth month, and even sooner, as experience shows daily. These motions prove to the accoucheur that the child is present in the developed uterus, and are the pathognomonic sign of pregnancy.

The results obtained by the stethoscope only confirm the first proofs: but these alone are insufficient.

DIVISION OF THE FETUS.

After studying the fetus in its anatomical and physiological relations, we proceed to consider it in the practice of obstetrics.

If parturition terminated always in the same manner, if it were never attended with accidents, if on the contrary, the assistance of art was not often necessary, the details about to be given, would be perfectly useless. Unfortunately, experience proves, that the life of the female and her child would frequently be compromised, if powerless nature were unassisted.

The fetus may be divided into the head, the trunk, and the extremities, or lower limbs; the upper limbs belonging to the trunk in our division.

The head is oval, elongated from before backward, and is composed of the skull and face. The skull is much larger proportionally than the face; it is formed of the same bones as in the adult, with this difference, however, that the frontal bone is always divided into two equal parts, a right and a left.

In the fetus, the bones of the skull are very movable, and the head is easily compressed longitudinally. These advantages are owing to membranous sutures, which unite the bones of the skull, and to several fontanelles, which are also membranous: two, particularly, are remarkable for their extent; one, the anterior, the *fronto-parietal*, is quadrilateral: it is situated in the centre of the sincipital region: the other, the posterior, the *occipito-parietal*, is triangular, and occupies the centre of the occiput. (*See Pl. XXIII. Fig.* 1.)

In the head of the fetus, we distinguish four diameters, and four circumferences.

The first diameter, the *occipito-mental*, extends from the centre of the lower jaw to the occiput; it measures five inches. (*See Pl. XXIII. Fig.* 3.)

The second, the *occipito-frontal*, extends from the centre of the forehead to the occiput; it measures four and a half inches. (*See Pl. XXIII. Fig.* 3.)

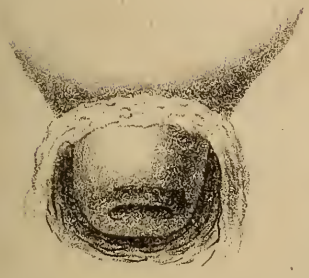
The third, the *bi-parietal*, extends from one parietal protuberance to the other; it measures three and a half inches. (*See Pl. XXIII. Fig.* 1.)

The fourth, the *basio-sincipital*, extends from the centre of the anterior fontanelle, perpendicularly to the base of the

Fig. 1.

Position of the finger while touching.

Fig. 2.



State of the neck at 3 months.

Fig. 3.

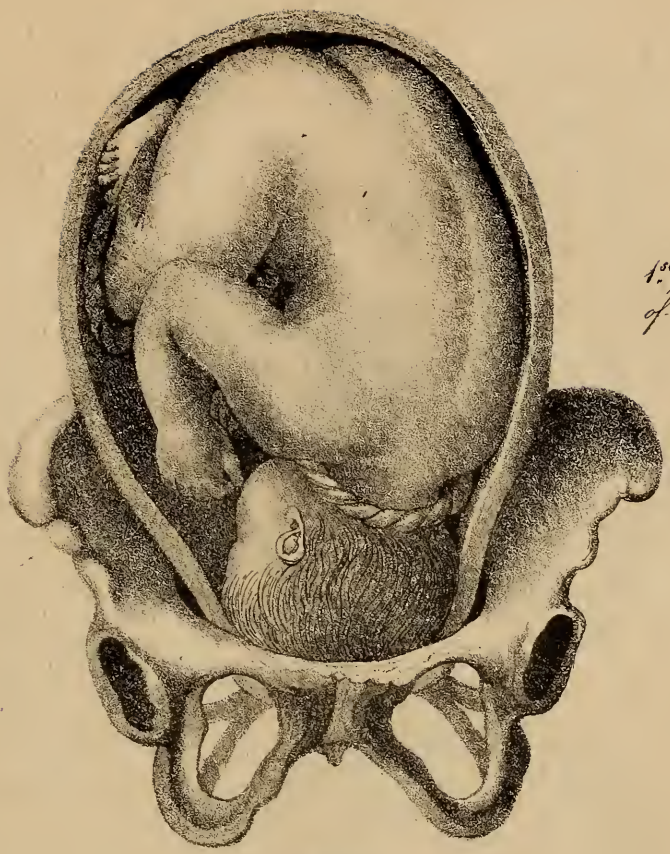
State of the neck at 6 months.

Fig. 4.

State of the neck at 9 months.

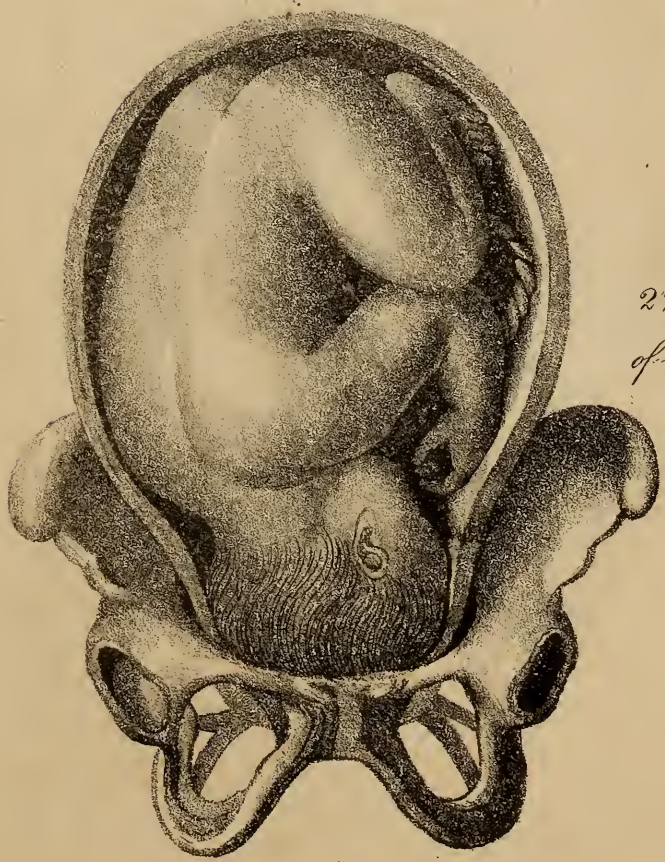
Drawn & Lith.d by D. C. Johnson N.Y.

Fig. 1.



1st Position of the head.

Fig. 2.



2nd Position of the head.

Drawn & Litho by Imbert.

Fig. 1. 3.d Position of the head.

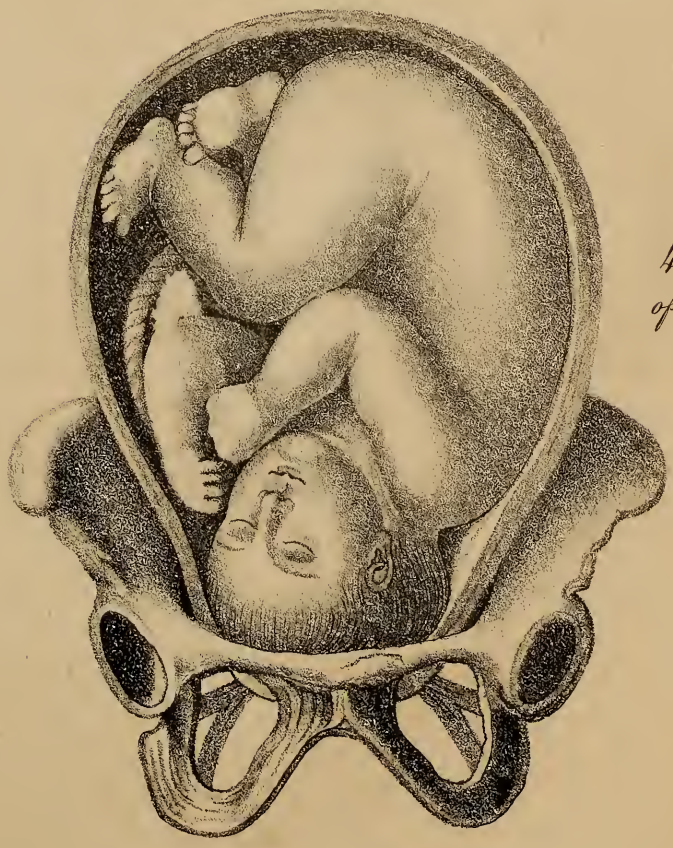


Fig. 2. 4.th Position of the head.

Drawn and fr. the by Imbert

skull: it measures three and a half inches. (*See Pl. XXIII. Fig.* 3.)

The great circumference passes around the head of the fetus from the forehead to the occiput, and thence returns over the base of the skull to the same point: it measures fifteen inches. (*See Pl. XXIV. Fig.* 1.)

The middle circumference proceeds over the head from the forehead to one of the parietal protuberances, thence to the occiput, and returns to the forehead, passing over the parietal protuberance of the opposite side: it measures thirteen and a half inches. (*See Pl. XXIV. Fig.* 2.)

The small circumference leaves the sinciput, passes on one of the parietal protuberances, and returns to the point whence it started, proceeding over the base of the skull and the parietal protuberance of the opposite side: it measures eleven and a half inches. (*See Pl. XXIV. Fig.* 3.)

The head can move in several directions, the knowledge of which is useful. The motion of flexion on the chest, and inclination on the shoulders, are safe. The motion of flexion backward, or rather of extension, when carried too far, may cause serious accidents, and even the death of the child.

The motion of rotation can only extend to one eighth of a circle: carried farther, it will inevitably cause the death of the child.

A knowledge of the trunk is much less important than that of the head: we shall only state, that the diameter between the shoulders, the *acromial* diameter, is four inches; and that its motions, which are less extensive than those of the head, must be made in the natural direction, especially in the different cases where any manœuvre is required.

The limbs of the fetus are very flexible. In fact they are like cotton, when bent in their natural direction; but of iron, when we attempt to curve them in the opposite.

NATURAL HISTORY OF PREGNANCY.

In the history of pregnancy, we must consider, first, its definition: second, its different divisions: third, its signs.

It must be admitted, that pregnancy forms the most important part of the generative functions; but it alone does not compose their whole history. In fact, the fulfillment of these functions requires the concurrence of several phenomena, which are all directed towards the same end, and all have for a definite result, the birth of a new being.

Menstruation is the prelude to the great work of reproduction, which cannot be accomplished without a preliminary and indispensable act, which is repeated with infinite shades, in all species possessing the power of reproduction: this act is generation. Conception then, is only the union of the principles supplied in the act of generation, and pregnancy the positive state of a female who has conceived. But how long a period elapses between each of these two great phenomena? Anatomy cannot tell: physiology, with her brilliant hypotheses, cannot inform us: the imagination alone can scarcely appreciate the imperceptible distance between them. The only mode of making known her ideas on so wonderful a subject is to say: From the moment that generation takes place, conception occurs, and pregnancy exists.

Definition. From these remarks, pregnancy may be defined: the state of a female, who, after conception, con-

tains within her the fecund principle of a new being. Pregnancy commences, then, directly after conception, and terminates by parturition. Its entire duration is usually two hundred and seventy days, or nine solar months. However, this period may possibly be retarded or advanced some days, as is proved by well supported facts. But this is not the place to examine a subject which belongs to legal medicine.

Division and differences. Pregnancy must be considered, first, according to its situation; second, the nature of the substances which form it; third, the number of the productions which compose it.

In regard to its situation, it is divided into uterine and extra-uterine: each may be true or false.

A. Let us first mention extra-uterine pregnancy. We distinguish three principal kinds, viz: pregnancy in the Fallopian tube, ovarian pregnancy, and abdominal pregnancy, which may be primitive or secondary. Several other varieties of extra-uterine pregnancy may be admitted. These will not be mentioned by us, as the most eminent practitioner scarcely sees an instance of their occurrence.

In extra-uterine pregnancies, the product of conception rarely reaches its full growth: admitting even that it does, as the female cannot expel it from the place in which it is situated, its death is an inevitable consequence of nature's error.

The signs of extra-uterine pregnancy are very equivocal: consequently, it must be recognized, not by analogy, but rather by opposition to uterine pregnancy.

As the issue of all these pregnancies is most generally unfortunate, when the child arrives at a certain size, the happiest termination for the female is the death of the fetus

about the second or third month of pregnancy; its development thus being arrested, it putrifies.

B. Uterine pregnancy is that in which the product of conception, being deposited in the uterus, is there developed according to the known laws of the organization of animals. It is divided into true or false.

The term false or apparent pregnancy, is generally applied to any state of the female which resembles real pregnancy, and may deceive even the most experienced physicians.

The different circumstances which may give rise to these kinds of pregnancies, generally depend on more or less severe morbid affections which may affect the uterus or its appendages, the intestines, or any other part of the abdomen: among these we must mention particularly, moles, hydatids, polypi, water, blood, mucus, air, chronic induration of the uterus, the development of a fibrous body in its substance, schirrus, dropsy of the ovaries, of the tubes, ascites, tympanitis, tumors in the mesentery, &c. &c.

True uterine pregnancy is also called natural, common, favorable, &c.; it may be simple or compound. It is simple when there is but one fetus in the uterus; compound, when there are several.

Signs. The signs of pregnancy may be distinguished into presumptive or rational, and positive or sensible.

A. The presumptive or rational signs are those which induce us to suspect or presume that the female is pregnant. Although these signs are quite numerous, they are very uncertain, and we can only draw conjectures from their existence. Some of these signs affect the whole system; these are the general presumptive signs: others merely manifest themselves in some special point of the

economy; these are the particular or local signs. The first are drawn from all the changes experienced by the female in the regular and natural progress of her functions, in her habits, her peculiar inclinations and tastes, the effects of which are marked particularly by the paleness of the countenance, and a certain alteration in the figure, which belongs only to pregnant females, but which the most experienced eye cannot always detect.

The particular or local signs are more positive: we may prove their existence: when alone, they do not indicate with certainty the reality of pregnancy, but they deserve all the attention of the practitioner. These signs are first, the suppression of the menses; second, the enlargement and development of the abdomen; third, the discoloration of the areola, its brownish appearance; fourth, the swelling of the mammæ, and the dribbling from the nipple.

1. There are two remarkable periods in the life of the female, during which the menses are suppressed, although the health is not manifestly incommoded: these two periods are during pregnancy and lactation. The suppression of the menses, however, is so far from being a certain sign of pregnancy, that it is not always a rational sign; this evacuation is more subject than any other to variation and derangement. Besides, its constant and regular appearance does not prove that the female is not pregnant, since numerous examples show that females, although pregnant, have menstruated, at least during the early months of gestation.

2. When a female perceives that her belly enlarges, and is developed, she believes herself pregnant, especially if this sign be complicated with the suppression of the menses.

It is true that pregnancy is attended with an enlargement and development of the belly: but the causes, independent

of pregnancy, which may produce this development, are too numerous for us to attribute to this sign its true value in case of real pregnancy. Farther, the belly does not visibly enlarge until after the third month, and as touching at this early period of pregnancy, can afford but vague conjectures, we must pronounce, very reservedly, upon an increase in the size of the belly as a rational sign of pregnancy. At a later period, when pregnancy is very much advanced, the size of the belly does not confirm it: other and more positive signs leave no doubt of its presence.

3. The sympathy between the uterus and the mammæ explains sufficiently the influence of pregnancy on the latter. This influence is not felt, generally, until towards the fourth month; but it does not cease until after parturition, at which time other functions are established in these organs. Not unfrequently, however, the mammæ swell, at the early periods of pregnancy, and there is even a manifest dribbling from the nipples. These anomalies render the swelling of the mammæ uncertain as a presumptive sign of pregnancy, although it is one of the least equivocal, because the causes which occasion false pregnancies, rarely produce on the mammæ the same effect as real pregnancy. Alone, however, the swelling of the mammæ and the dribbling from the nipple, should be far from inducing the belief of pregnancy, since these phenomena have appeared in females who were not pregnant, and even in very young girls.

4. The dark and brownish color of the areola and the nipple, is generally regarded as a sign of pregnancy, because it is demonstrated that dropsies, and all other circumstances which may produce an enlargement of the belly, have no action on the mammæ, and do not change the form or color

of these organs. This sign, however, would not always be sufficient to confirm the existence of pregnancy; some females naturally have a dark areola, and others, who have even borne several children, have never experienced any alteration in this part, which has always preserved a slightly rosy color, even after several pregnancies.

B. The sensible, positive, or demonstrative signs of pregnancy, are of two kinds. The first are drawn from the sight and touch; they form its experimental or practical history. They make known the changes in the form, figure, and situation of the uterus, during pregnancy: these may be called the physical signs of pregnancy.

The second are imperceptible to the senses: they result from the changes in the organization of the uterus during pregnancy, which are produced in it by the properties it then enjoys, and which form the physiological phenomena of pregnancy. Their study composes what we call the physiological history or the rationale of pregnancy: they are the true rational signs.

1. *Experimental history of pregnancy.* At the end of the first month, the accoucheur has no sensible evidence of the existence of pregnancy, nor even of a fullness or action in the uterus: none of the natural signs are yet manifested, and the general signs mentioned by some authors are too vague to be believed. This is not true, however, at the end of the second month (sixty days): the practice of touching, may strictly teach us to distinguish the state of fullness of the uterus, as also the slight changes supervening in its figure and size, and lead us to presume the existence of pregnancy. The following is a rapid figure of the physical phenomena presented during the course of gestation, observed at the end of each month.

During the first month, the uterus seems to experience no sensible change in its form and volume. It is even probable that so far from enlarging, it on the contrary contracts, as if it would embrace more intimately the new product enclosed within it.

At the end of the second month, it enlarges very much; its form is rounded; it fills most of the lower pelvis: but the belly, on the contrary, becomes more contracted, more tense, and sometimes even a little painful.

After the third month, it increases in size and in length; its base rises as high as the pubic region; it is then on a level with the superior or abdominal strait. The finger, introduced into the vagina, perceives its rounded, globular, equal form. It may be raised without pain to the female. The belly is slightly tumefied by the crowding back of the intestine. (*Pl. XXV. Fig.* 2.) But the neck is not changed in any manner, and consequently can present no evident marks of pregnancy. If it were possible to apply the stethoscope within the vagina, its use, at this time, might be valuable by determining the uterus to be filled by an organized body.

At the end of the fourth month, the uterus rises above the lower pelvis; its base is two or three fingers' breadth above the region of the pubis. The belly is evidently enlarged; but the existence of pregnancy can be best ascertained per vaginam. In fact, ballottement is possible at this period, as the head of the fetus at this time is large and heavy enough to respond sensibly to the motion imparted to it. Even at this period, the female sometimes feels the first motions of the child.

At the end of the fifth month, the existence of pregnancy may be ascertained with certainty. Both the sensible and

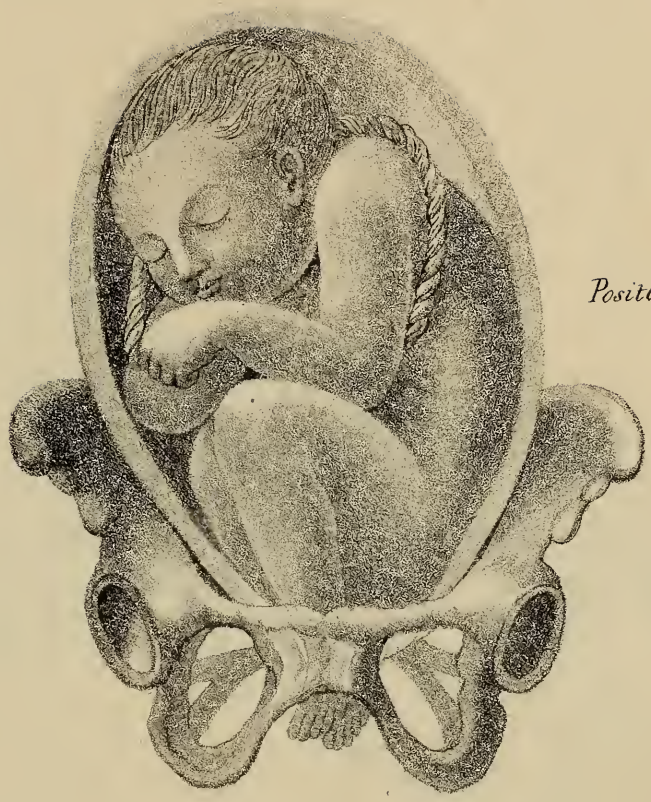


Fig. 1 *Position of the feet*

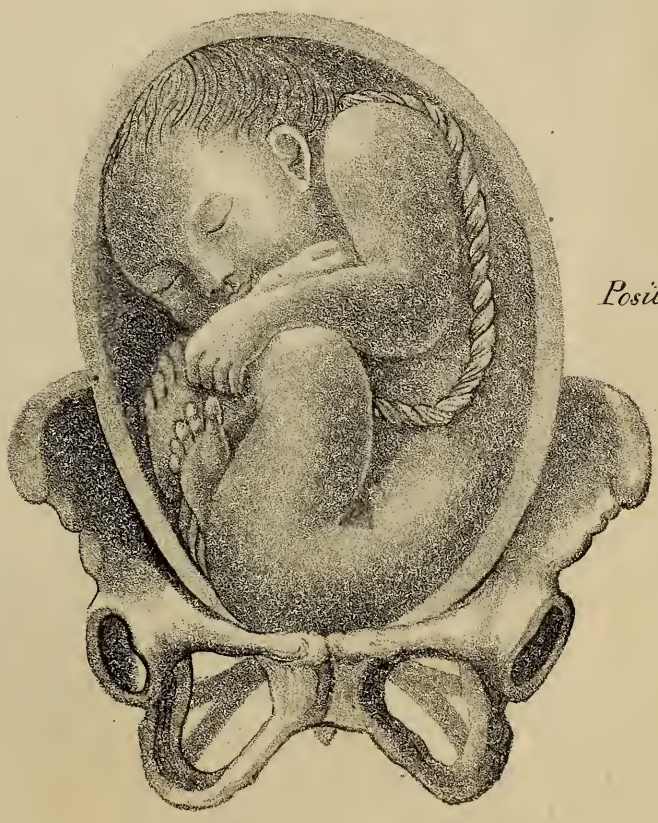


Fig. 2. *Position of the thighs.*

Lithog. of Imbert.

Fig. 1.

Seizing the feet in the 1st. position.

Fig. 2.

Seizing the trunk

Lith. of Imbert.

elivery of the arm.

Fig. 1.

Delivery of the head

Fig 2.

E. Bisbee del. & lith. N.Y.

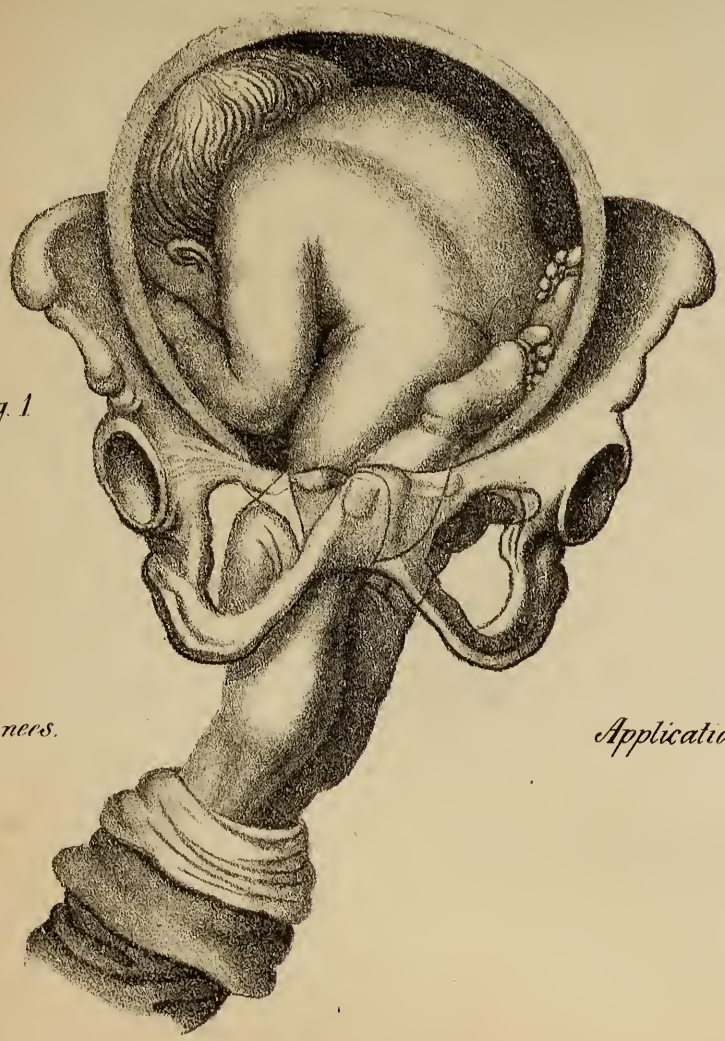


Fig. 1

ing the knees.

Fig 2.

Application of the fillet.

issio del!

Fig 1.

Fig 2.

Drawn in the Breech

Disengaging the Feet.

rational signs unite to confirm it. The base of the uterus is found at two fingers' breadths below the umbilicus. Touching, evidently shows the presence of the child, and ballottement, when skillfully performed, manifests it with the utmost facility.

At the end of the sixth month, the uterus is developed so rapidly that its base rises two fingers' breadths above the umbilicus. Its general form is that of an ellipse very much elongated from above downward. By touching, the head of the child can easily be felt through its distended parietes. Ballottement is performed without difficulty: but at the end of the sixth month, one peculiarity exists not observed before. The neck of the uterus, which as yet had not participated in the development of its body and fundus, begins to enlarge a little towards its base: its lower orifice slightly opens, and even the neck swells and becomes softer; indicating that it is finally prepared to take part in the general dilatation of the uterus.

During the seventh month, the base of the uterus, which has risen a little higher, begins to enter the epigastric region. But the degree of its elevation is less, and it decreases, and the uterus, instead of being elliptical, tends more and more to assume the spherical form, which depends on the opening of the neck, and the active part it then takes in the dilatation of the womb. In fact, the neck becomes shorter and softer. Its lower extremity opens very sensibly, and admits the end of the finger with ease. At this time, also, the lower planes of the uterus increase in extent, by which the woman becomes much larger. Ballottement begins to lose its elasticity, the child's head being so large that it is no longer displaced with the same facility. But

this circumstance only renders pregnancy still more evident, and serves to determine its advanced stage.

During the whole of the eighth month, and especially towards the end of it, the base of the uterus occupies most of the epigastric region. It becomes much more capacious, and more and more spherical and rounded: the umbilicus is distended; the neck becomes shorter, and less hard; it is soft, and enlarged, especially towards its anterior lip. The child's head is large and heavy, the finger raises it with difficulty, and ballottement can no longer be performed.

At the end of the ninth month, and consequently of pregnancy, the base of the uterus, so far from rising more and more, as one might think, is situated lower than it was at the end of the eighth month. It is found near the umbilical region. The amplitude of the organ affects the sides in consequence of the dilatation of the neck and its extreme enlargement. The neck itself has entirely disappeared, and now assumes the form of a soft cushion, more or less enlarged. The child's head becoming larger and heavier, is as it were engaged in the superior strait, and it is raised with great difficulty. (*See Pl. XXV. and XXVI. Fig.* 4. *and particularly Pl. XXVII. and XXVIII.*)

Such is a brief statement of the changes in the form, figure and size of the uterus during pregnancy; let us now mention those in its organization. They constitute the physiological phenomena of pregnancy, with which the general history of this function terminates. We shall complete this part by the history of *touching*.

Physiological phenomena of pregnancy. Beside the visible and sensible signs of pregnancy already mentioned, there are others which are imperceptible to our senses, and

which occur in the proper organization of the uterus: we refer to the properties developed by fecundation, and made known to us by pregnancy alone. These properties are the dilatation of the uterus, its proper action, and its contraction.

Dilatation of the uterus. This is as remarkable as any of the phenomena of pregnancy; the dilatation in fact is slow, but constant and progressive, until parturition. Although this dilatation is very evident, it is as surprising as it is difficult to explain. In fact it is hard to imagine that an extremely small ovum, composed of very thin membranes containing a small embryo resembling mucus, can, without destroying its frail tissue, extend and dilate an organ like the uterus, which is more than half an inch thick in every part, and the resistance of which would be almost insurmountable, if its dilatation depended solely on a mechanical cause.

However difficult it may be to conceive of the dilatation of a body as strong as the uterus, by a substance as weak as the fetus, we can easily be satisfied of its possibility, by stating the means which industrious nature, attentive to the preservation of the product of conception, employs to execute it.

As soon as the fecundated ovum arrives in the uterus, it is attached to some point of its internal surface. By the extreme irritation there produced, it causes the afflux of fluids of every kind, *ubi irritatio, ibi humor:* the fluids passing through the slight tissue which unites the ovum to the uterus, are propelled downward with a force proportional to the base and the height of the current of all the fluids of the system, and must finally force the tissue of the uterus to yield, to enlarge from within outward, and consequently to dilate.

The uterus, however, is by no means inactive in this admirable work, nor does it merely yield to the efforts of the embryo. The generative act not only communicates life to the fecundated germ, but it also affects the uterus, which instantly acquires, *proprio motu*, the power of extending, enlarging, and finally of presenting all the phenomena of dilatation; and it is to this development, as well as to the powerful activity of its vital properties, that the uterus owes the varied phenomena of this dilatation, since no mechanical agent is necessary to produce it, as the uterus dilates in an extra-uterine pregnancy. We must admit, however, that the slow but progressive growth of the fetus, and the constantly increasing accumulation of the waters of the amnios, are powerful causes of this phenomenon, which requires the concurrence of these latter to continue at the same degree of activity until the end of pregnancy. To render this truth still more sensible, we add, that the fluid constantly reacts against the parietes of the uterus in every direction. Finally, the last cause which tends to dilate the uterus, is the development of its vessels, which enlarge, and admit a greater quantity of blood; their parietes are thus distended, the uterus is enlarged, and consequently is expanded.

Proper action of the uterus, or of its tone. The uterus, so far from being passive during pregnancy, possesses an active power, proportional to the force and energy of its vital properties. This power, which the ancients termed the tonic force, and to which the moderns have applied the expression organic contractility, or the contractility of the tissue, is so inherent in the special organization of the uterus, that when lost during gestation, both the mother and child are affected with symptoms which are

much more serious, because their formidable consequences cannot always be subdued. This, however, might be attained, if we were better acquainted with the manner in which this property acts, the principal end of which is the certainty and preservation of pregnancy.

But although it may be very difficult to determine the true character of the tone of the uterus, it is very easy to point out the bad effects resulting from its opposite state, which is termed uterine inertia, or syncope; in this state, the feebleness of the uterus depriving it of sensation and motion, it is incapable of contracting, and the orifices of a great number of blood-vessels are naked and open, the hemorrhage from which may destroy the mother and child. One evident proof that the inertia of the uterus alone causes the symptoms, is, that the true remedy is to excite the tone of the uterus, by rubbing the abdomen, by applying cold water and vinegar to the same region, and also to the internal and upper part of the thighs; finally, by all the modes which are proper to cause its contraction and tend to restore its primitive degree of energy.

Contractility of the uterus. Besides the two properties already mentioned, the uterus possesses another power also, in common with all the voluntary muscles, viz.: contractility. It differs from them, however, in several respects, which it may be useful to mention. Generally, the uterus never contracts so forcibly as when it wishes to expel some material body, which is inclosed in its cavity, which is more or less enlarged, whatever may be the cause producing it: so far from being entirely voluntary, the contractility of the uterus seems involuntary. In fact, during the early stages of labor, there are frequently long intervals between the pains, and the female cannot accelerate their return at

pleasure, however impatient to be speedily delivered. On the other hand, in the last stages of labor, the pains are so severe and return so quickly that the female is not only unable to arrest them, even if she wishes it ; but she is even obliged to second these efforts, and to assist in expelling the child's head, and consequently in terminating the labor.

The contractility of the uterus resides essentially in the tissue of this organ, as does likewise the painful sensation attending it; hence, the term *pains* is commonly applied to the contraction itself. The last character of this faculty is, that its force and energy are always proportional to the obstacles opposing it, and the efforts made to conquer it. Sometimes it acts so powerfully, that the hand of the accoucheur, introduced to execute a manœuvre, is benumbed, and sensation and motion are instantly lost.

OF TOUCHING.

Among the modes of determining the existence of pregnancy, *touching* is the most essential, as it unites all the conditions requisite to establish the sensible and positive signs of pregnancy. Considered in this respect, touching may be defined a manual operation, the object of which is to ascertain the changes in the situation, the figure, and the consistence of different parts of the uterus, not only during pregnancy, but also during and after parturition. In order that this operation may be successful, the index finger of one hand must be introduced into the vagina, to discover the state of the neck, the opposite hand being applied to the abdomen, to judge how much the uterus is developed, and from combining these two modes of investigation, to form

an opinion of the existence of pregnancy, and then to determine the period of gestation.

The female may be touched in an erect or horizontal posture: the manner of touching differs in these two cases.

Of touching,—the female standing. This mode is advantageous in every respect. The parts of the female are in their natural position, and the accoucheur cannot be mistaken. The mode of proceeding is as follows: the female stands erect; her back supported by some vertical plane, should remain motionless during the operation: her legs are separated, and the pelvis carried forward; the hands hang down, or are gently crossed on the abdomen; and the whole form should be perfectly at ease. The accoucheur then oils the index finger of one hand, introduces it by the posterior commissure within the vagina, passes it up to the neck of the uterus, which is generally situated to the right and backward: by examining carefully, he determines its extent and size, its degree of resistance and flaccidity: if the os tincœ be open, the end of the finger is carefully introduced, to judge how much it is shortened, and thus to determine the period of pregnancy; the neck not being able to yield thus and to lose its extent and resistance without contributing to the dilatation of the uterus, and thus concurring in its enlargement. (*See Pl. XXXII.*) While the accoucheur thus passes the index finger within the vagina, he must place the palm of the opposite hand on the abdomen, to judge of the changes produced by the progress and development of pregnancy, in the figure and size of the uterus: he must also determine the height to which the uterus has risen, by pressing slightly on that part of the abdomen, to which its base corresponds.

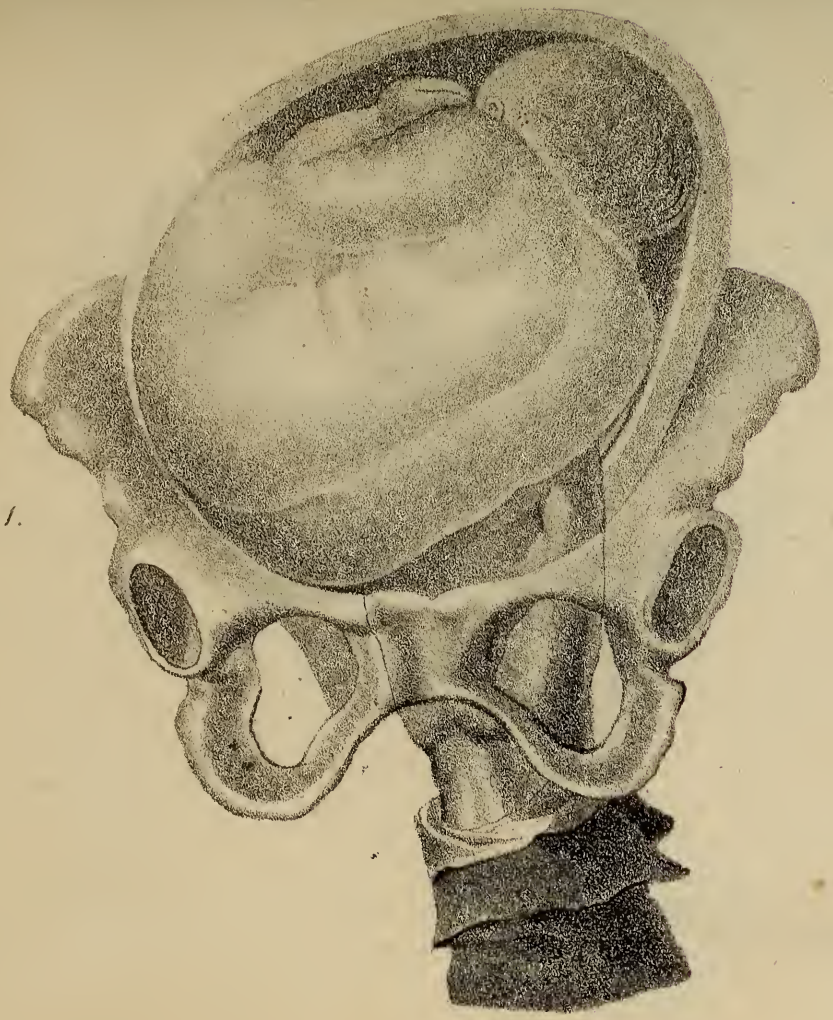
We have now to mention the mode of ascertaining the

presence of the child in the uterus, and how ballottement may be performed: we proceed in the following manner. We easily see a depression between the neck and the adjacent part of the bladder, to the base of which the lower part of the uterus corresponds: the head of the fetus is generally situated near this point, after the fourth month of pregnancy: here also the accoucheur must place the extremity of his finger, while the opposite hand is applied to that part of the abdomen where the base of the uterus is situated; then by an alternate action, sometimes by the hand placed on the abdomen, sometimes by the finger in the vagina, he raises and depresses the child. This is called ballottement. (*See Pl. XXXI.*)

Ballottement can rarely be performed until the fourth month of pregnancy; before this time, the head of the child is too small, and the quantity of the waters of the amnios proportionally too great, to perceive it through the parietes of the uterus. Ballottement is most easily performed from the fourth to the seventh month, as the head is then more elastic. Farther, this phenomenon, so wonderful in its effects, not only demonstrates the certainty of pregnancy, but also that the child is living; since a dead fetus never responds as promptly and lightly to the motions impressed upon it.

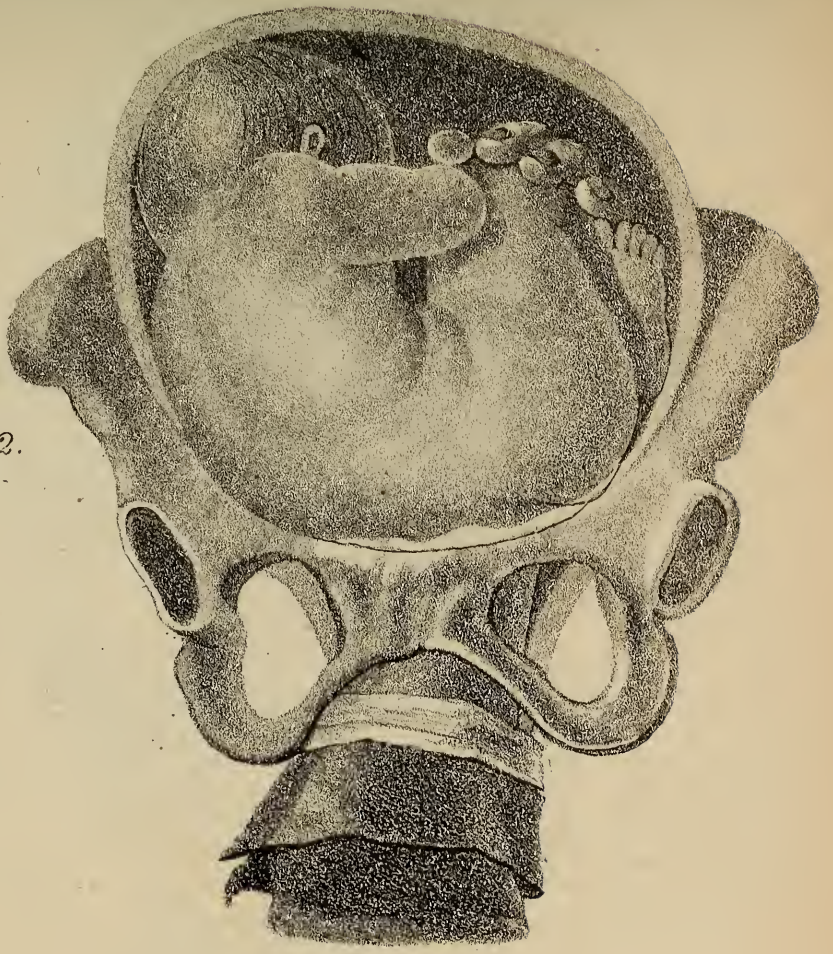
After the seventh month, and in the latter periods of pregnancy, the head of the child becomes heavier, and as the quantity of the waters of the amnios diminishes inversely, it follows that ballottement is then very difficult, and even impossible: this, however, only becomes a still stronger proof of pregnancy, as the child's head then occupies most of the superior strait, in which it seems already engaged, and the finger easily passes over its whole surface.

Fig. 1.



1st position of the back.

Fig. 2.



2nd position of the back.

Lithog. de Imbert.

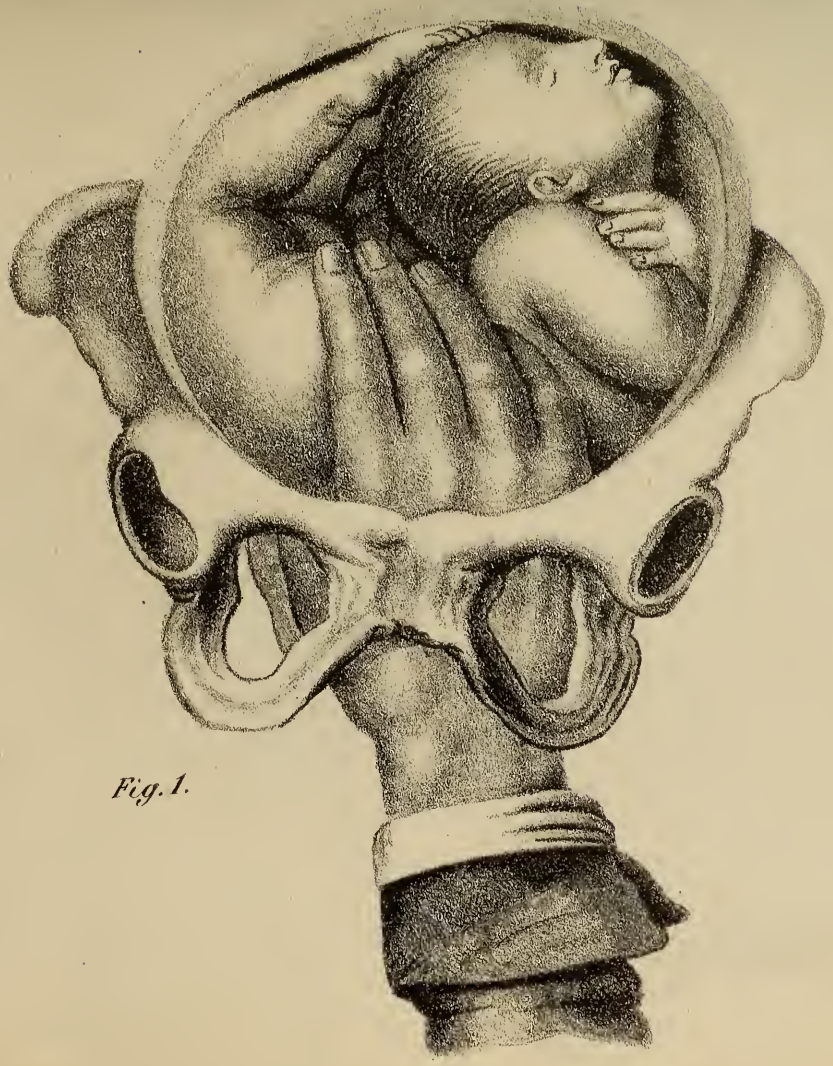


Fig. 1.

1st position of the belly

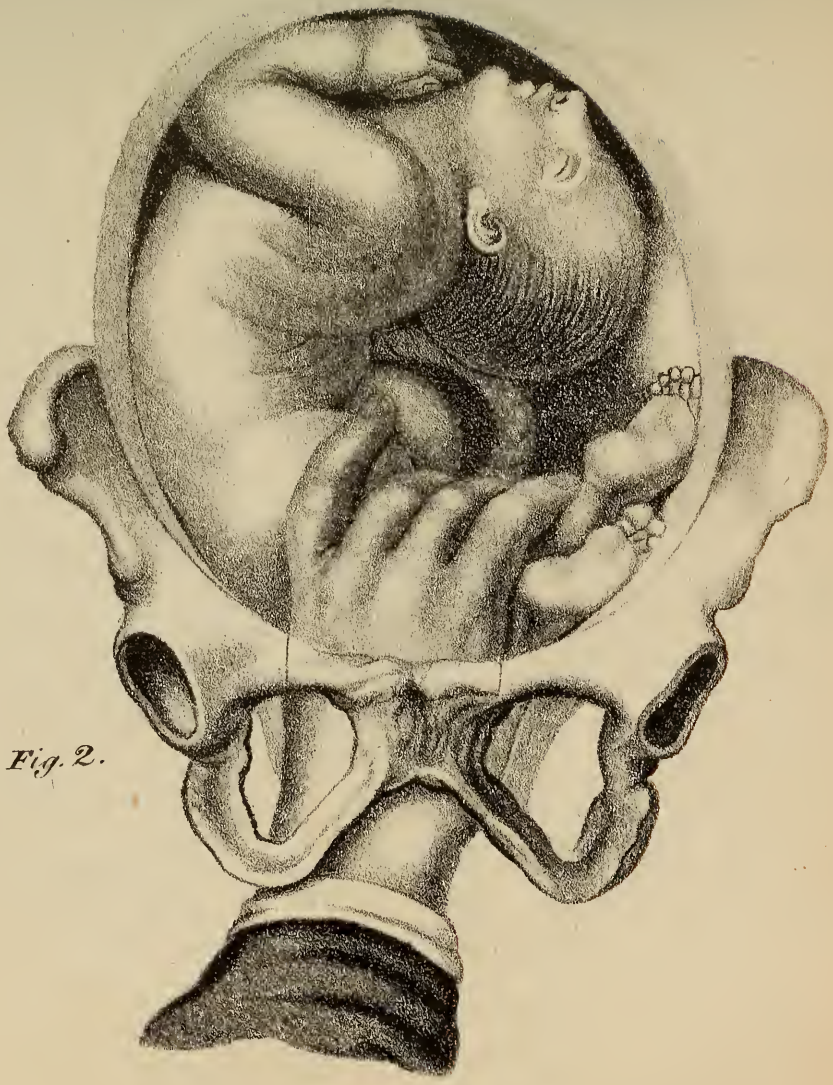


Fig. 2.

2nd position of the belly.

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D.G. Johnson lithog.r

2nd position of the Thorax.

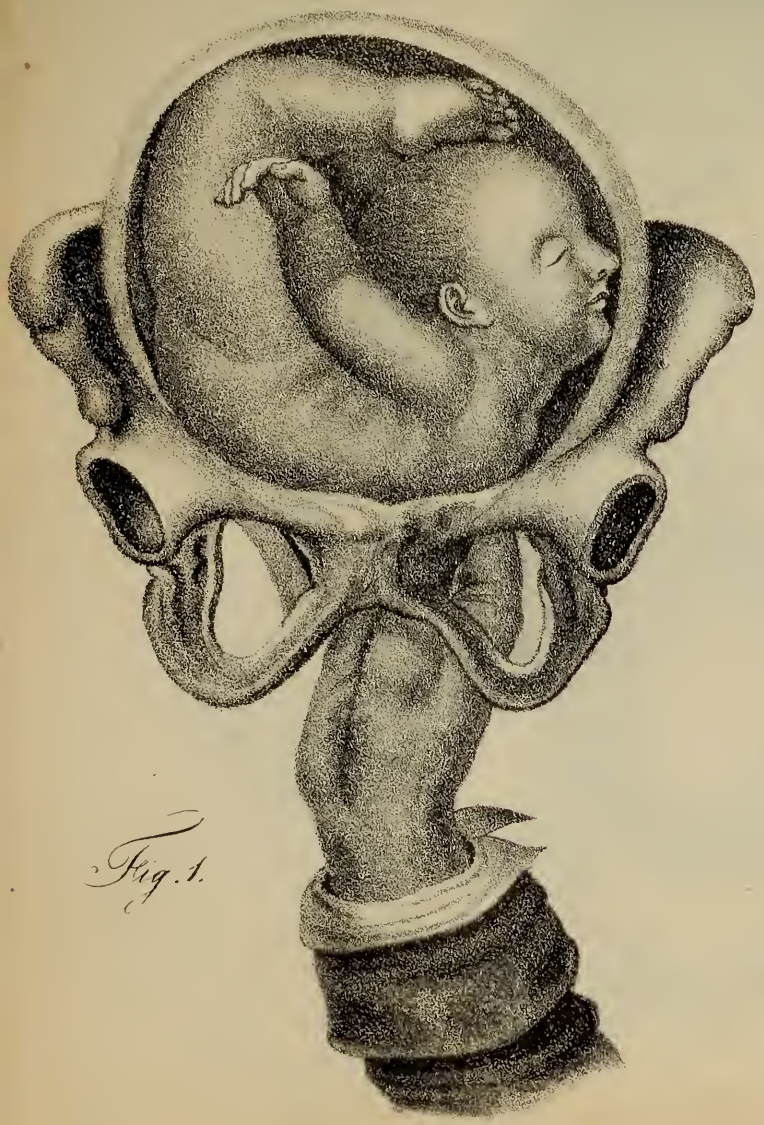


Fig. 1.

First position of the Thorax

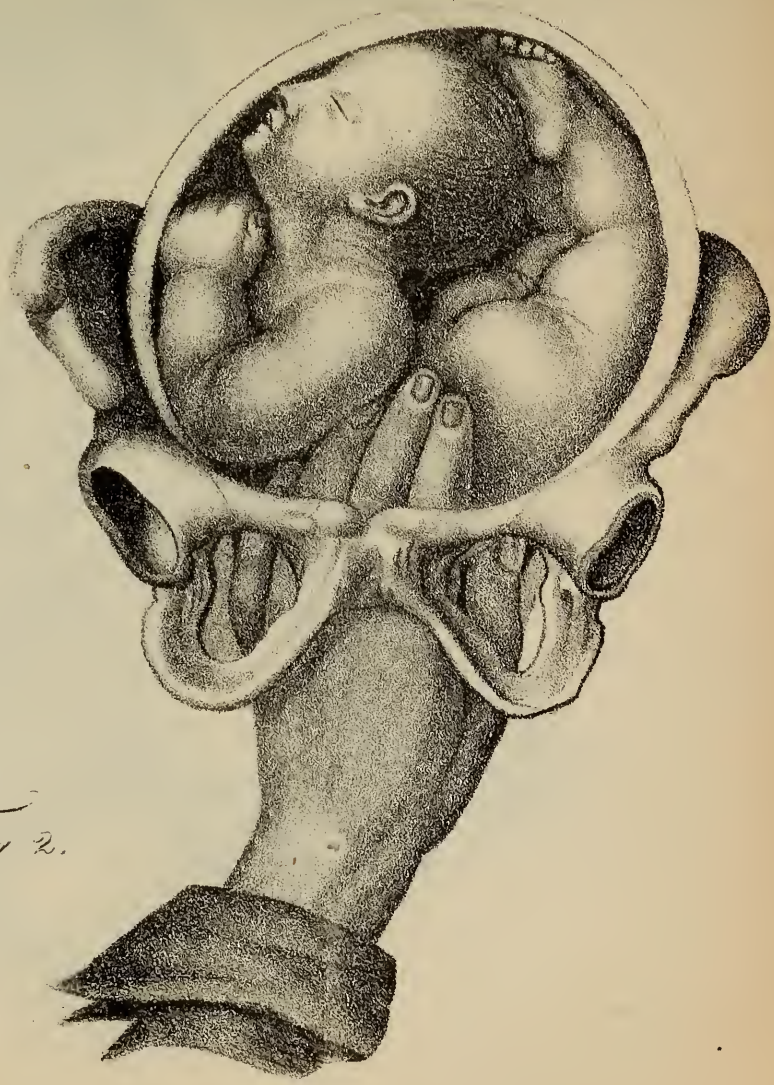


Fig 2.

Litho. of Imbert.

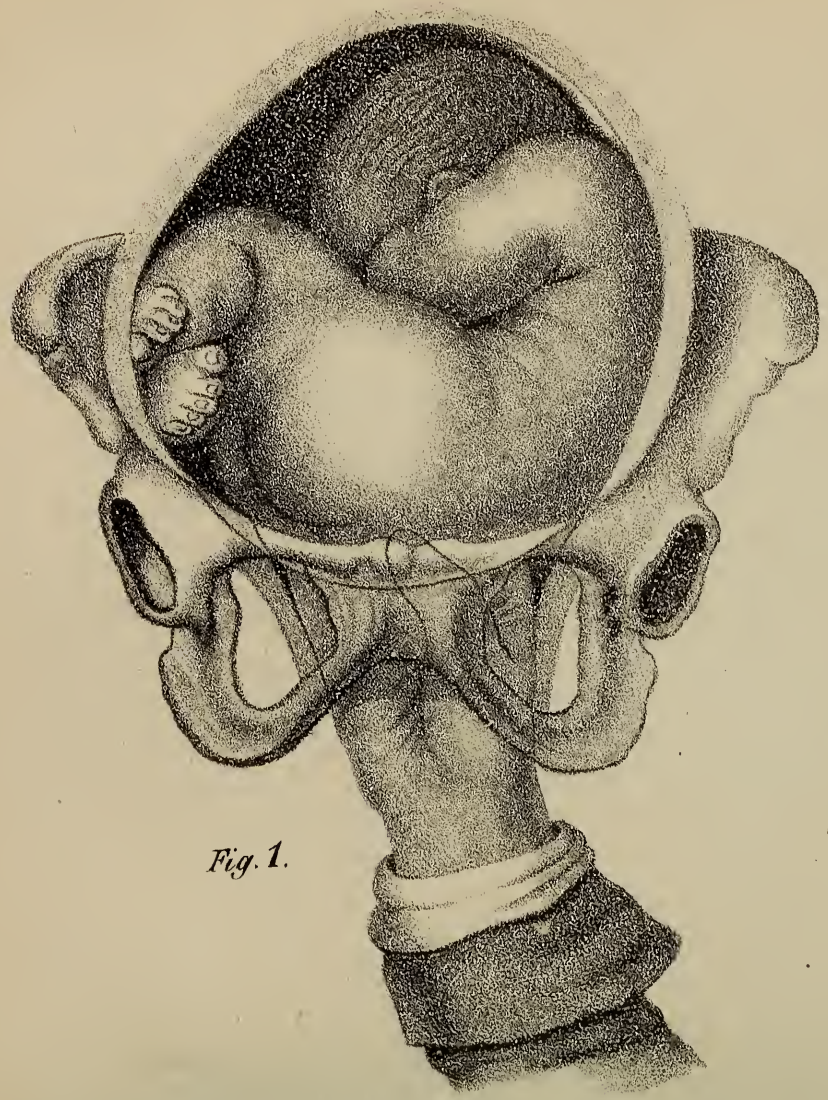


Fig. 1.

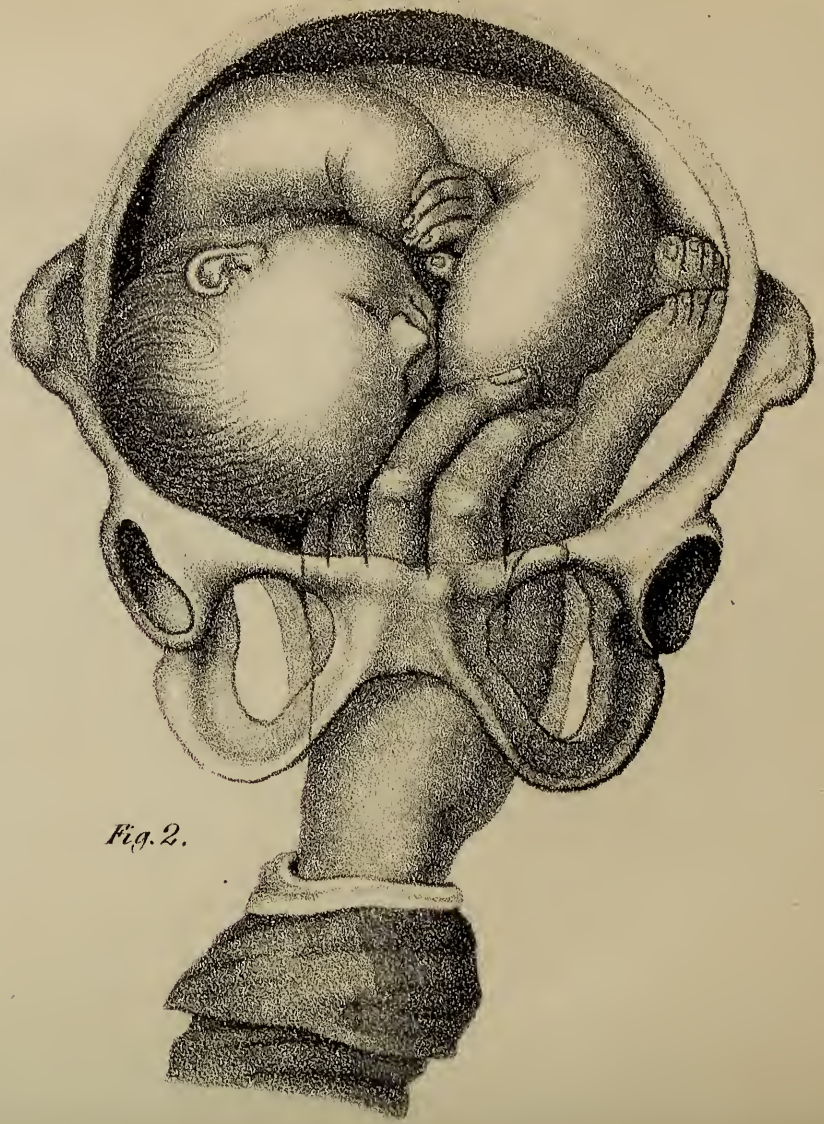


Fig. 2.

1st position of the right hip.

2nd position of the right hip.

PL. XLV.

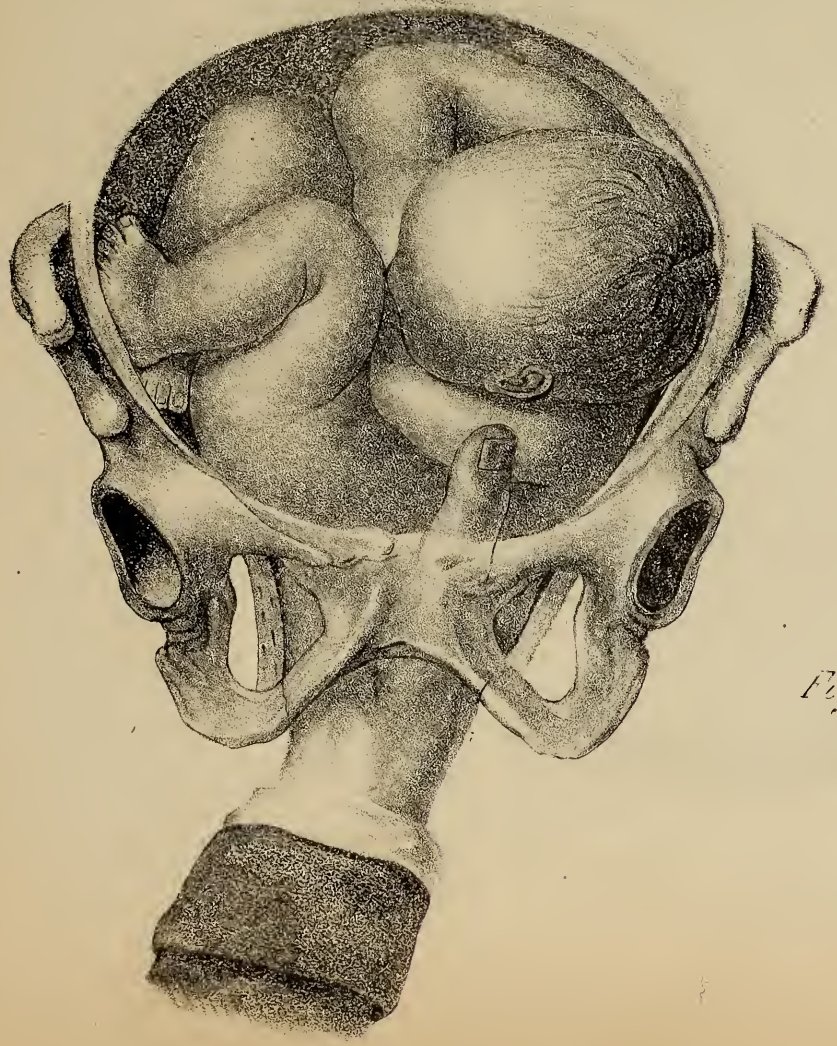


Fig. 1.

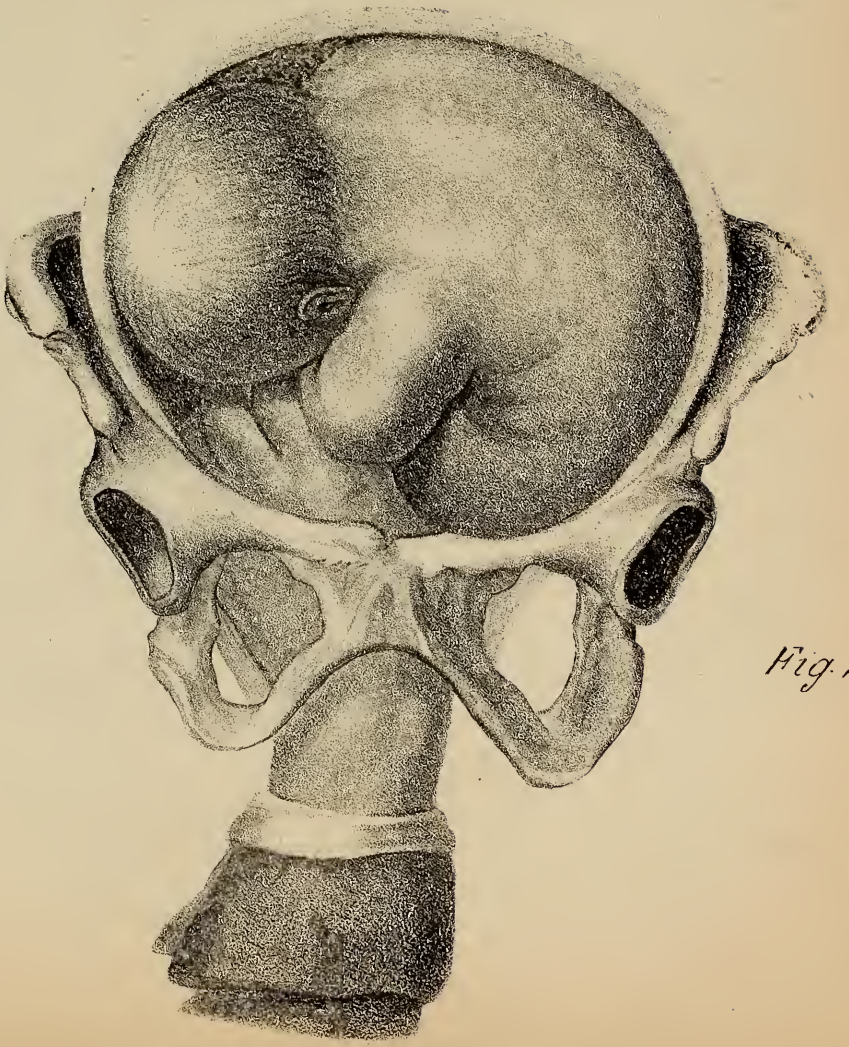


Fig. 2.

Of touching,—the female reclining. The mode of touching while the female is reclining, differs a little from that just mentioned, and must be practised when ever the preceding mode would not afford the same results. It is most advantageous during the first three or four months of pregnancy. During labor, both methods can be employed with the same success: but after parturition, and during the period of lying-in, the female to be touched must always be in a horizontal posture, and consequently lying down. In order to practice it successfully, the head of the female should be gently flexed on the chest, the legs upon the thighs, which are slightly separated. The accoucheur should stand on the right side of the female, if he touches with the right hand, and *vice versa*, if the left hand be used: the index finger of one hand is introduced into the vagina, as before, and the other hand is placed upon the abdomen. But as the neck exhibits no indication of pregnancy until the fourth month, he must merely raise the body of the uterus, balancing it slightly between the two hands, while he executes this operation.

No advantage can be derived from placing the hand upon the abdomen during labor: the finger introduced into the vagina is alone sufficient to make known whatever precedes and accompanies the termination of labor. This is not true, however, after the child is born, and during the lying-in. In the latter case, it is often necessary to introduce an index finger into the vagina, and to examine if the uterus has contracted, by placing the hand at different times on the abdomen.

OF LABOR.

In labor we must consider, 1st, its definition; 2d, its division; 3d, its causes; 4th, its phenomena; 5th, its termination.

1. *Definition.* We define labor, a natural function, by which the female gives birth to a living, full-grown and healthy child.

2. *Division.* Labor is divided according to the period when it occurs, and the manner in which it terminates.

In regard to the period; when it occurs before the fifteenth day of pregnancy, it is termed an *efflux:* when before the seventh month, an *abortion:* premature labor, when occurring from the seventh to the ninth month: and natural or common labor, when terminating at the ninth month.

Every author has made a more or less arbitrary classification of labor, from the manner in which it terminates: these classes are frequently unsanctioned by reason, and disavowed by practice. A good classification of labors must be founded on the nature of the means used for their termination, and not on vague expressions.

3. *Causes of labor.* The causes of labor are proximate or efficient, remote or determinate.

The proximate or efficient causes are, those which appear at the moment of labor, and which in a measure preside at its termination. They may be divided into natural, common or general, and accidental, unforeseen or individual. The latter also are subdivided into external and internal. Of the first kind, are blows, falls, compression, &c.: to the second, belong the lively emotions of the mind; as fear, anger, &c.

The remote or determinate causes are not specified so easily. They, in turn, have been ascribed to the size of the child, the acridity of the waters, the impossibility of a greater dilatation of the uterus, the necessity which the child has for breathing, eating, &c. These, however, are by no means the true determining causes of labor: they consist in the progress and development of pregnancy.

4. *Phenomena of parturition.* Of these, four are admitted as principal: they are, pain, dilatation of the neck of the uterus, formation of the bag of waters, and discharge of glairy mucus.

5. *Termination.* The termination of labor may be natural or artificial. It is natural, when finished by the contractions of the uterus alone: it is artificial, when art interposes, and one of the means which compose the manœuvre is employed. In this place, we shall treat only of natural labor, which is properly termed parturition.

Labor may terminate naturally in four different ways; by the head, by the feet, by the knees, and by the breech.

In order that the labor should terminate naturally, several circumstances must concur, some of which concern the mother, and others the child: in regard to the mother, she must have sufficient strength and courage to second the efforts inseparable from the labor of child-birth: the differ-

ent diameters of the pelvis also must be large enough to allow the head to pass, and both the internal and external organs of generation must offer no obstacle.

In regard to the child, the dimensions of the head must be in proper proportion with those of the pelvis, and the occiput must present at the superior strait.

A. *Presentation of the head.* The head, the occiput presenting, may be placed in four different ways at the superior strait: hence the four kinds of natural presentations of the head. In the first, the occiput is situated forward and to the left, and corresponds to the inner part of the cotyloid cavity of the left side, and the face looks toward the right sacro-iliac symphysis: this is the *left occipito-cotyloid position.* (*See Pl. XXXIII. Fig.* 1.) In the second, the occiput is placed to the right and forward, and corresponds to the inner part of the right cotyloid cavity: this is the *right occipito-cotyloid position.* (*See Pl. XXXIII. Fig.* 2.) In the third, the occiput is situated backward and to the right, and corresponds to the right sacro-iliac symphysis: this is the *right occipito-sacro-iliac position.* (*See Pl. XXXIV. Fig.* 1.) In the fourth, the occiput is placed to the left and backward, and looks to the left sacro-iliac symphysis: it is the *left occipito-sacro-iliac position.* (*See Pl. XXXIV. Fig.* 2.)

First position of the vertex. In this presentation, the sagittal suture is in relation with the oblique diameter of the pelvis, which proceeds from the inner part of the left cotyloid cavity, to the right sacro-iliac symphysis. In consequence of the labor, and the contractions of the uterus, the head vibrates in this position, by which motion the posterior fontanelle, which is forward, describes a line curved from above downward, and from the left forward, to

come towards the sub-pubic opening, while the anterior fontanelle, which is situated posteriorly, also describes a curved line in an exactly opposite direction. By this motion, the occiput is depressed under the symphysis pubis, while the chin tends to re-ascend towards the sacro-vertebral prominence, being bent forcibly on the chest; this diminishes the antero-posterior diameter of the head in the same proportion, which being then situated between the two tuberosities of the ischium, soon projects from the external organs of generation. It now appears in the form of a rounded, shining, and more or less bulging tumor. The accoucheur must be very careful to sustain it by placing the hand across the perineum, (as is seen in *Pl. XXXV. Fig.* 1.) in order that the child's head, which is then pushed forward by very rapid and quick contractions, may be properly directed, and escape unimpeded, through the external organs of generation, following the direction of the axis of the inferior or perineal strait.

When once emerged, the head moves quickly, so that the occiput is turned towards the inner part of the left thigh: at the same time, the shoulders, which constantly remained in the direction of the oblique diameter, opposite to that occupied by the head at the superior strait, are placed, on entering the cavity, the right behind the symphysis pubis, and the left in the hollow of the sacrum.

Second position of the vertex. In this position, which is the most common next to the first, the sagittal suture is situated diagonally in the direction of the oblique diameter, which extends from the right cotyloid cavity to the left sacro-iliac symphysis. The posterior fontanelle looks forward, and the anterior fontanelle backward, as in the preceding position.

The mechanism of labor takes place exactly as in the first presentation, with this difference however: that when the head of the child is delivered, the occiput is turned to the right, as it was to the left in the preceding case. In this position the shoulders appear and the labor terminates precisely as in the first.

Third position of the vertex. In this, as also in the next position, the head is situated at the superior strait, directly opposite to what it was in the first and second positions; in these latter, the occiput was situated at the anterior part of the pelvis; in the last two, it looks towards its posterior part.

As the head progresses through the pelvis, the posterior fontanelle is depressed in the cavity of the sacrum, while the anterior, on approaching the arch of the pubis, constantly rises towards the symphysis pubis. As the labor advances, and the contractions of the uterus become more lively and expulsive, the occiput is forced towards the perineum, distends it very much, forming through it a projecting tumor. The forehead is then situated under the arch of the pubis, and presents a point of support to the head, and thus favors its final expulsion, forcing the occiput towards the more or less distended vulva.

The head, when delivered, is situated on the side, and the occiput is turned towards the inner part of the right thigh. The shoulders soon present themselves at the vulva, the left under the arch of the pubis, and the right towards the posterior commissure: they are soon followed by the rest of the child, which is thus born face upward.

Fourth position of the vertex. In this position, the sagittal suture is parallel to one of the oblique diameters of the pelvis, the posterior fontanelle is situated to the right and

backward, and the anterior fontanelle to the left and forward. In this position, the mechanism of labor is the same as in the third; the occiput proceeds by a rotatory motion, into the hollow of the sacrum, while the forehead constantly rises towards the symphysis pubis. In consequence of this double motion, the occiput projects across the more or less distended perineum. But the occiput soon rises towards the vulva, while the face glides behind the pubis, and the head finally emerges as we have stated: in this last position, the occiput turns to the right instead of the left, as in the third position.

B. *Natural presentation of the feet.* When the feet of the child present at the superior strait, they may be placed in four different ways; hence four special positions.

First position of the feet. In this position, the heels look towards the left cotyloid cavity, and the toes to the right sacro-iliac symphysis: the posterior parts of the child are situated forward and to the left of the uterus. (*See Pl. XXXVI. Fig.* 1.)

As soon as the membranes are ruptured, the feet, and the rest of the lower extremities, are easily delivered. At this time, the left haunch looks towards the right cotyloid cavity, and the right haunch to the left sacro-iliac symphysis. The child, however, continues to descend, and the arms, which soon rise on the sides of the neck and head, serve to fix it diagonally, so that the occiput looks to the left cotyloid cavity, and the forehead to the right sacro-iliac symphysis. The head soon passes into the cavity of the pelvis, rotating from the left forward, so that the occiput describes an arch under the symphysis pubis, while the face, and particularly the forehead, proceed in an opposite direction towards the cavity of the sacrum. Finally, the

occiput passes from below the symphysis; the chin also performs a parabolic motion from above downward, which carries it to the posterior commissure; a last effort expels the head and the upper extremities, and the labor terminates.

Second position of the feet. Here the heels look to the right cotyloid cavity, and the toes to the left sacro-iliac symphysis; the posterior parts of the child are forward and to the right. Since the mechanism of labor is exactly the same as in the preceding position, we shall not dwell upon it; we shall only remark that the child, in proportion as labor advances, is always situated obliquely, so that the right side is constantly in relation with the left cotyloid cavity, and the left side with the right sacro-iliac symphysis. It is not until birth, that the head rotates, so that the occiput is situated under the symphysis pubis, and the face in the cavity of the sacrum.

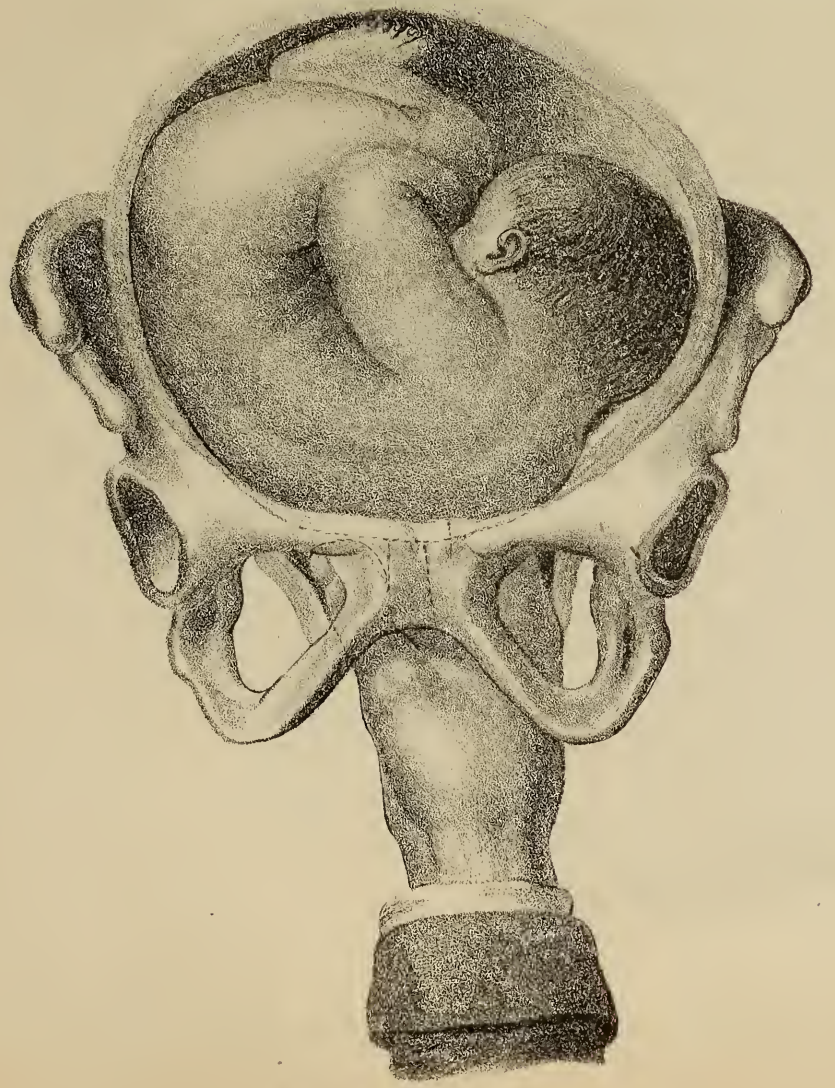
Third position of the feet. In this position, the heels look to the right sacro-iliac symphysis, and the toes to the left cotyloid cavity: the posterior surfaces are situated backward and to the right: in the fourth, the same surfaces look backward and to the left.

The mechanism of labor, in the third, as well as in the fourth position of the feet, is performed exactly as in the first two, until the breech presents. Then only the anterior surfaces of the child constantly remain upward, and when the head descends into the cavity, the forehead is situated behind and under the arch of the pubis, while the occiput is depressed into the cavity of the sacrum, and passes through its whole extent, as well as the perineum, which is more or less distended. The occiput escapes the first, after passing through the posterior commissure: the face is then

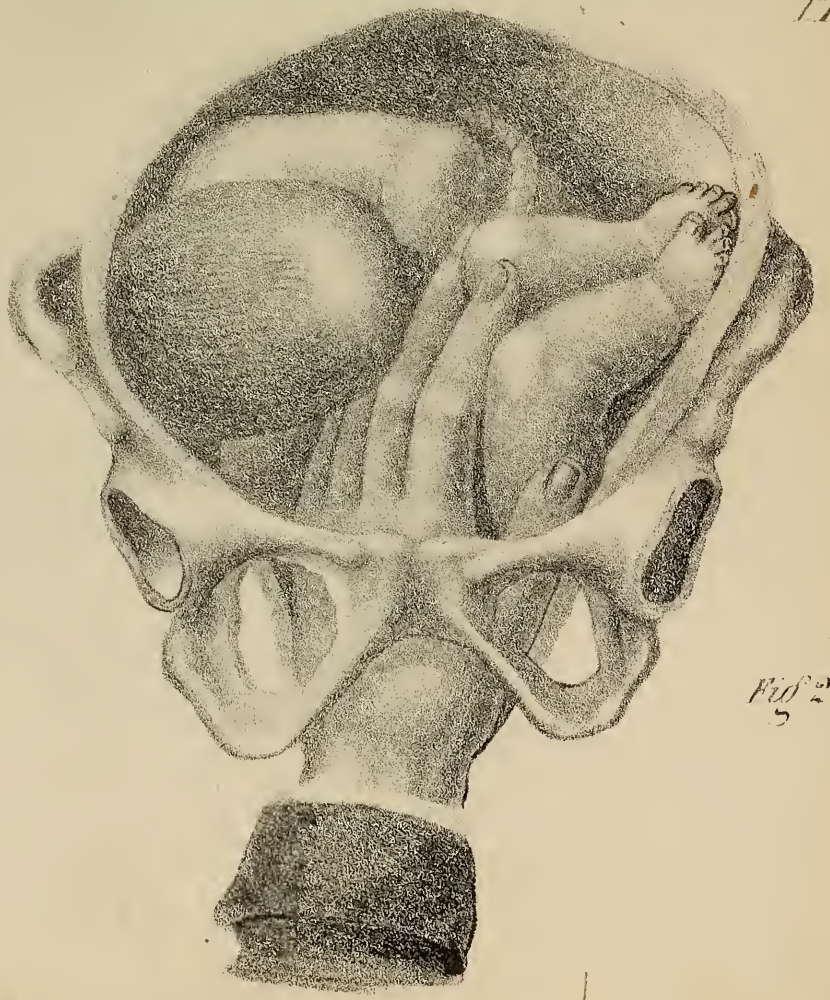
First Position of the right shoulder.

Second Position of the right shoulder.

PLXLVI.



Fig°1.



Fig°2.

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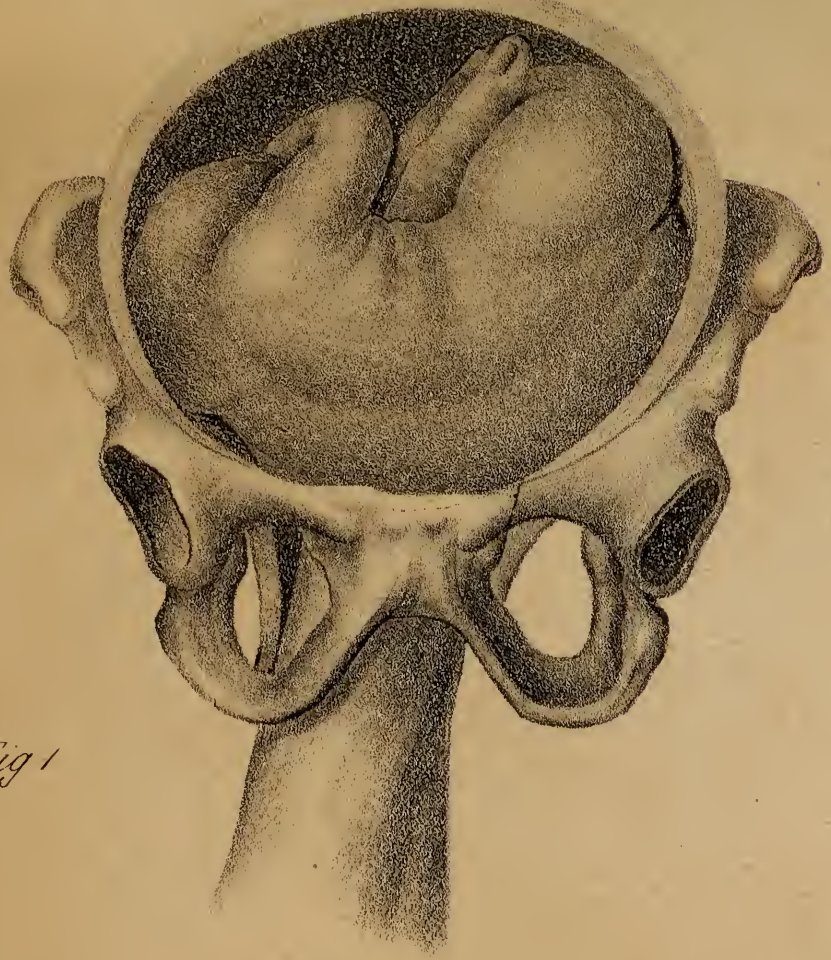

Fig 1

2nd Position of the left shoulder.

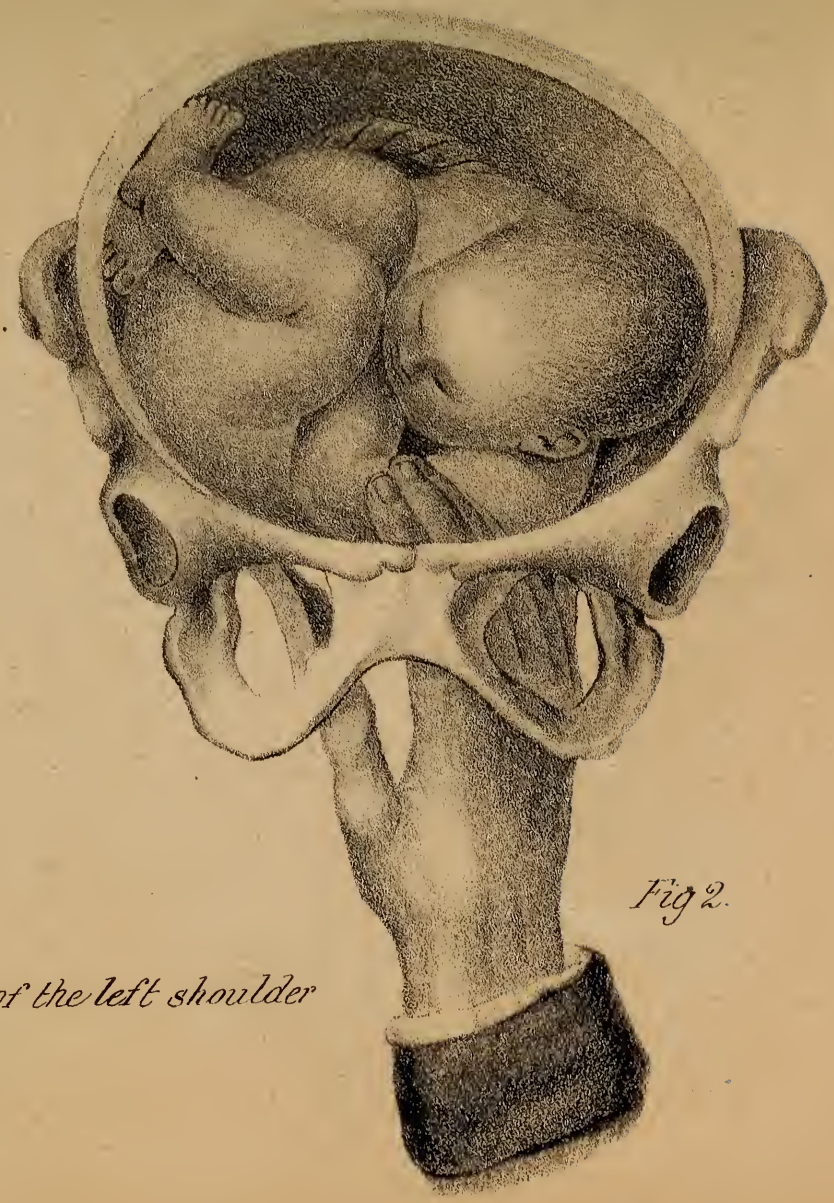

Fig 2.

1st Position of the left shoulder

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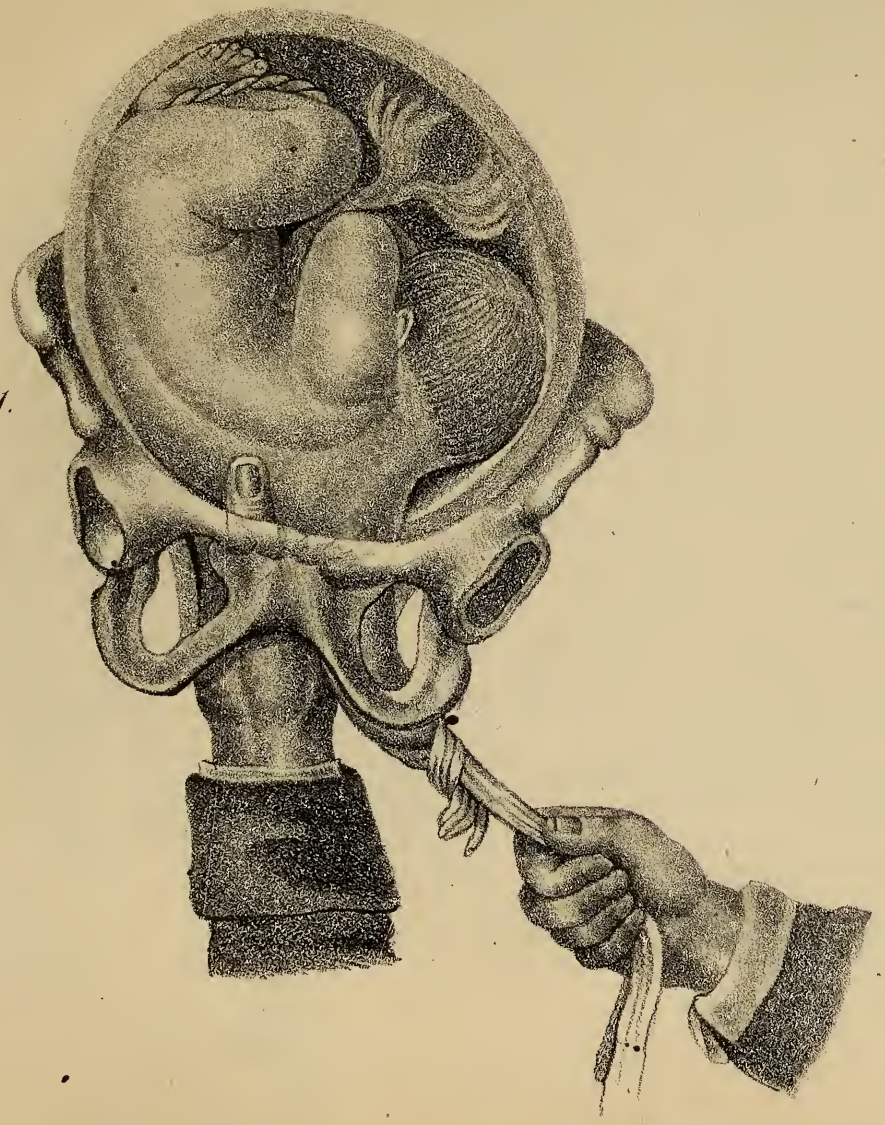
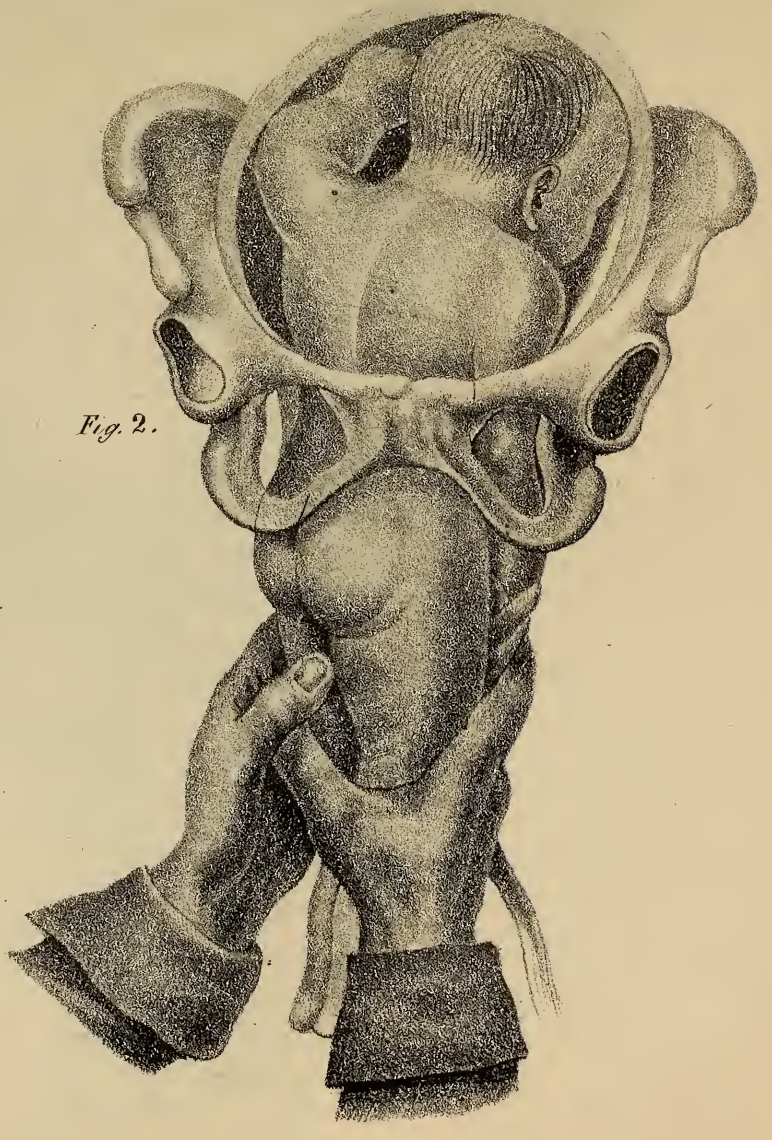
Fig. 1.



First position of the right shoulder, the arm tied

Fig. 2.



Same position with the arm out.

Imbert's Lithography.

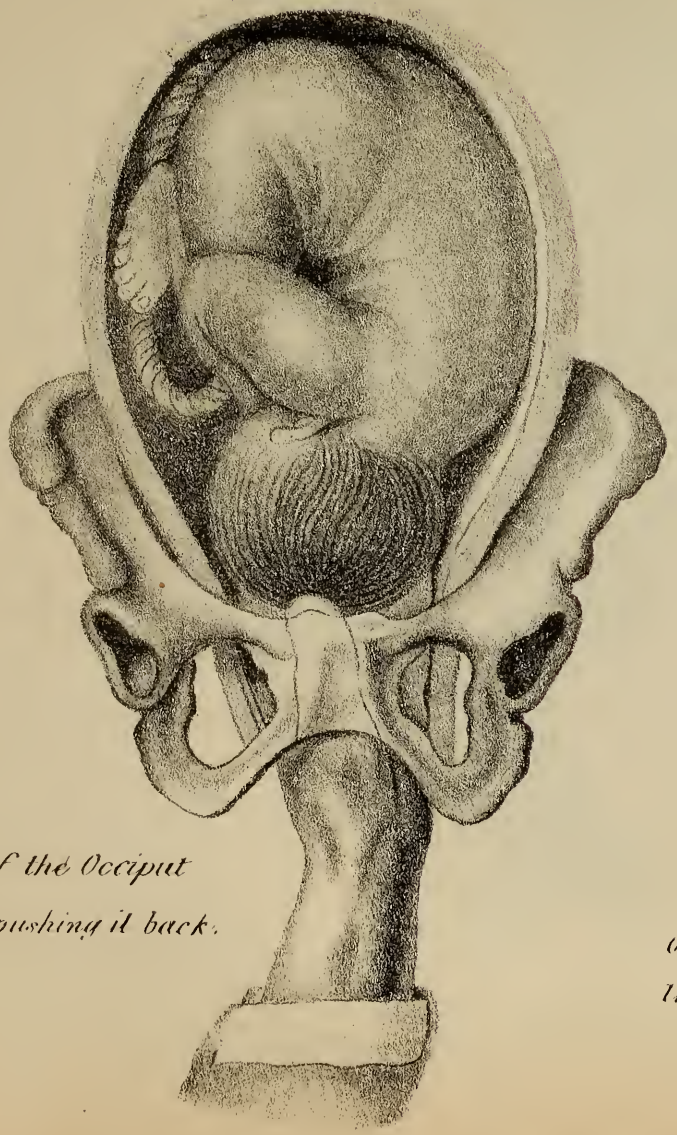


Fig. 1.

1st. position of the Occiput the left hand pushing it back.

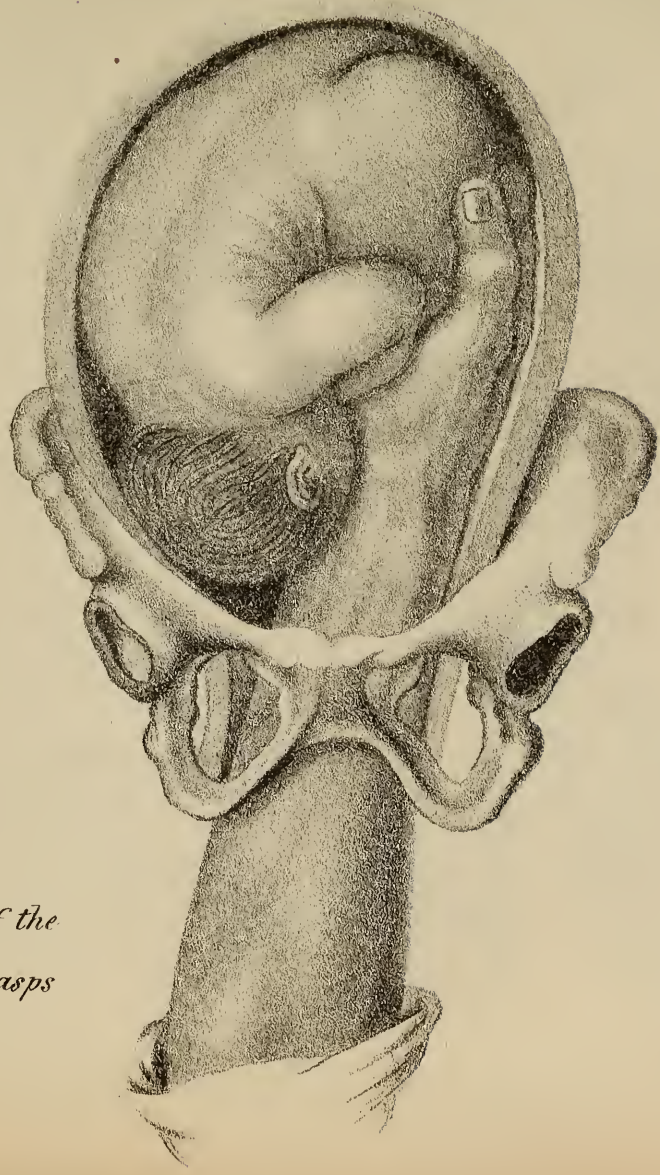


Fig. 2.

2nd. position of the Occiput, the right hand grasps the feet.

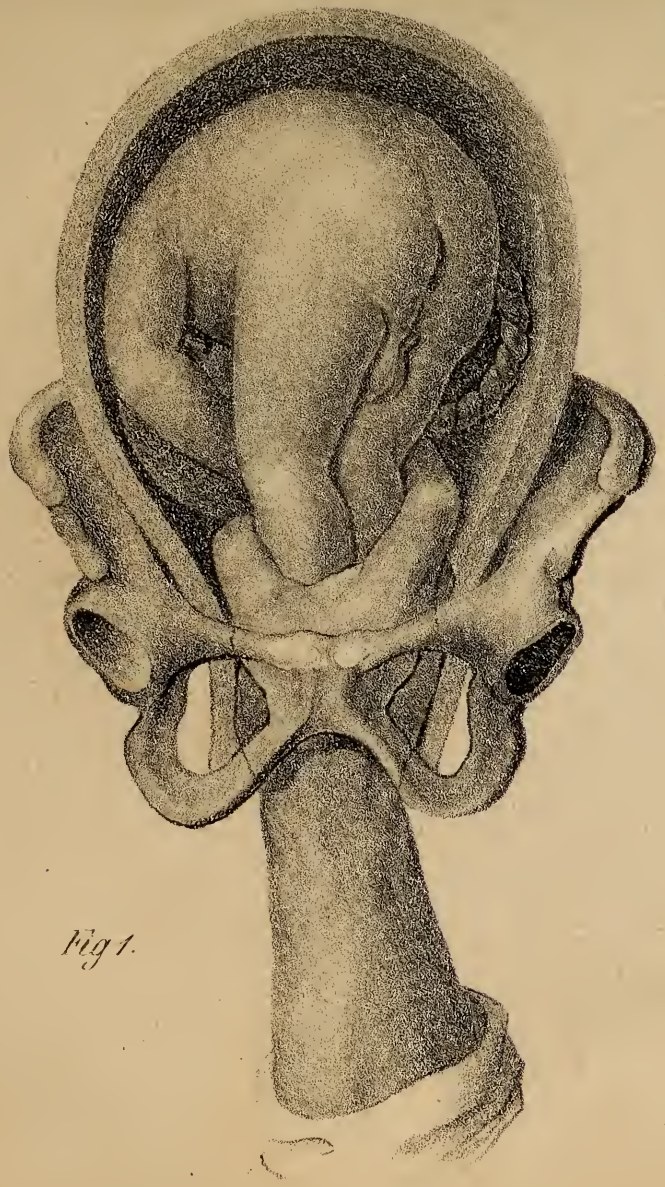
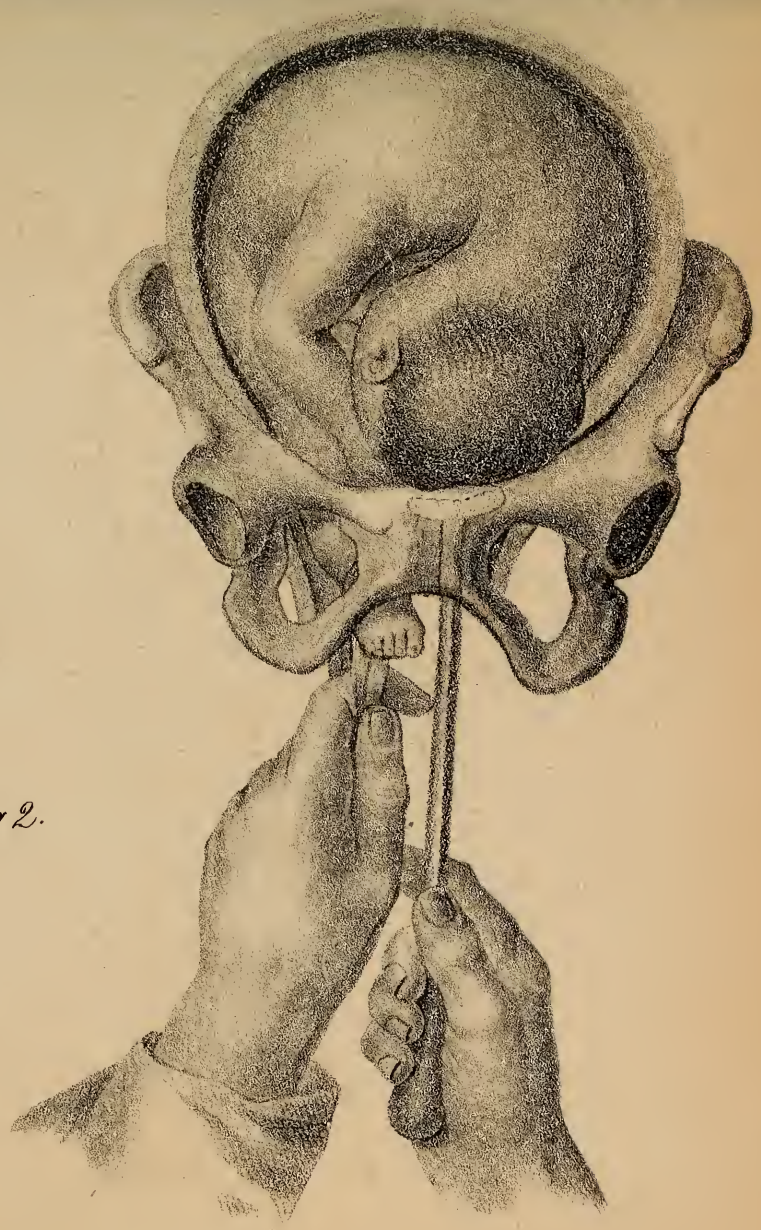


Fig 1.

Fig 2.



Delivery of the foot in one position of the head.

Application of the repousson

disengaged slowly, and without effort, from below the symphysis pubis, and the labor terminates.

Presentation of the knees. As this labor differs but slightly, or not at all, from that which terminates by the feet, we shall omit it.

Presentation of the breech. In the first position, the back looks directly to the left, and in the second to the right: the difficulty of establishing the characters of the third and fourth positions, obliges us to describe only the first and second.

In both positions, the child is doubled; the lower extremities are extended on its anterior surface. (*See Pl. XXXVI. Fig.* 2.)

The mechanism of labor is performed as follows: the breech is pressed by the contractions of the uterus, and is engaged, although with great pain, on account of its size, in the superior strait. If the labor continues, one of the haunches glides under the arch of the pubis, while the other passes slowly and with difficulty through the cavity of the sacrum, and thus comes to the posterior commissure. The thighs are then bulging, and the external organs of generation very much distended. The meconium often escapes, which confirms the presentation of the breech. While this latter is passing through the vulva, the arms are raised, and the head is soon engaged obliquely in the superior strait, through which it passes, as when the feet present.

OF THE MANŒUVRE.

We define the manœuvre, a manual operation, by which a labor is terminated, when nature alone is insufficient. The manœuvre is divided into *simple*, *compound*, and *complex:* it is simple, when the labor is terminated by the hand alone: it is compound, when some instruments are necessary, as the forceps, lever, &c.: finally, it is complex, when some capital operation of obstetrics must be employed, as hysteriotomy, symphysiotomy, &c.

The causes which oppose the natural termination of labor, and require the employment of some manœuvre, are of two kinds: the first, depends on the unfavorable situation of the child at the abdominal strait; for instance, when the back, or belly, &c., present: the second, results from unforeseen accidents, and severe symptoms supervening suddenly during the labor. In the first rank must be placed these causes: first, hemorrhage; second, convulsions; third, extreme debility, and repeated faintings; fourth, spasmodic contraction of the neck of the uterus; fifth, insertion of the placenta on the neck or edges of the uterus; sixth, premature expulsion of the umbilical cord; seventh, its shortness; eighth, the extreme obliquity of the uterus; ninth, irreducible hernia; tenth, unnatural size of the child's head;

eleventh, compound pregnancy; twelfth, a defect in the pelvis, or in the external organs of generation.

In every manœuvre there are four principal periods. 1st, the period of introducing the hand; 2d, that of exploration; 3d, that of turning; 4th, that of delivery.

1. *Period of introduction.* The female being placed in a proper position (*See Pl. XXXV. Fig.* 1 *and* 2.), the accoucheur oils one hand, and introduces it, partly bent, into the vagina, slightly separating the external labia by the posterior commissure: when once in the cavity, the hand is extended, and the index finger is directed towards the neck of the uterus, introducing the whole hand into the vagina, if it be sufficiently dilated. If this be not the case, he dilates it gradually, inserting successively the fingers of the hand, commencing with the index finger; in this manner, he arrives at the uterus.

2. *Period of exploration.* This second period is undoubtedly the most important, since the success of the termination of the labor depends on the precise knowledge of the parts of the child which present at the orifice. The parts then, on which the fingers are placed, must be explored with care, in order not to mistake the breech for the shoulder, the elbow for the knee, &c.; and lastly, the hand must be placed so as to arrive at the feet in the shortest and easiest way.

3. *Period of turning.* The hand having arrived at the feet, seizes them, and attempts to bring them to the orifice of the uterus, by moving the child so as to carry its anterior surface upward. In this motion, which is generally the laborious part of the manœuvre, the accoucheur should be particularly careful not to cross the child's limbs upon one another, and he ought not to bend them in an unnatural

direction. Fractures of the limbs are caused solely by forgetting this precept.

4. *Period of delivery.* The feet are brought to the superior strait, and the child is placed in one of the diagonal positions favorable to its expulsion, and the accoucheur delivers it as we proceed to state.

OF THE SIMPLE MANŒUVRE.

The simple manœuvre is divided into three sections: the first includes those labors in which the child presents some part of the lower extremities; the second relates to the different presentations of the trunk; and the third to those of the head.

Presentation of the lower extremities. It includes the presentation of the feet, the knees, and the breech.

A. *Presentation of the feet.* When the feet present, the child may be placed in four different ways, whence result four positions of the feet.

In whatever position the feet may be placed, their characters must be recognized, in order to distinguish them from the hands, with which, being very analogous, they may be confounded. Thus it should always be remembered, that the foot is longer and narrower than the hand; that it terminates at one extremity by a prominent part, the heel; that at the opposite extremity are the toes, which are short, even, and very near each other, while the contrary is true of the fingers; finally, that the foot makes an acute angle with the leg, while the hand is a continuation of the fore-arm.

First position of the feet, or the left calcaneo-cotyloid position. In this position, the heels look toward the inner part of the left cotyloid cavity, and the toes to the right sacro-iliac symphysis; at the termination of labor, the whole posterior surface of the child should progress parallel to a line, which is imagined to leave the cotyloid cavity, and to terminate at the occiput. In this position, the left hand must be introduced as most favorable to terminate the labor: this is termed the hand of necessity. (*See Pl. XXXVII. Fig.* 1.)

The left hand is introduced into the uterus; the child's feet are seized by placing the index finger in the space between the two feet, above the malleoli; the thumb is then extended on the outside of the left leg, and the last three fingers of the same hand on the outside of the right leg. We then pull slightly, and deliver the feet: this done, they are seized with both hands, and by moving them gently from right to left, the different parts of the child are brought down, until the thighs begin to present at the external organs. We now suspend our efforts for a moment in order to ascertain the situation of the umbilical cord, which must be formed with a knot, pulling more particularly upon its placental portion. Having executed this, two fingers of the left hand are placed on the left haunch of the child, and two fingers of the right hand on the right haunch. (*See Pl. XXXVII. Fig.* 2.) The child is now brought successively from the right groin of the mother to the inner part of the left thigh, being constantly kept in a diagonal position. This alternate motion is continued, until the shoulders begin to present externally: the arms must then be delivered. We must always commence by the one which is downward: we support the child on the left fore-arm, glide two fingers of the right hand along the child's arm to the

elbow, then by a motion of circumduction, it is carried successively over the sides of the head, the face, the neck, the chest, and then delivered, bringing it out from the right side of the vulva. The child is now depressed on the right fore-arm, and the left arm of the child, which is downward, is delivered by employing the same means as for the right arm. (*See Pl. XXXVIII. Fig.* 1.)

When the arms are delivered, the head is still above the superior strait, and its delivery is by no means the easiest part of the manœuvre. To perform it, the left hand is introduced into the vagina, gliding it along the anterior surfaces of the child, which look downward; two fingers are placed upon the upper jaw, below the nose; two fingers of the other hand upon the occiput, which is above; then by a double motion, viz. extracting the head, and depressing the face on the chest, the head is brought into the small pelvis without changing its diagonal position; now, by rotating it a quarter of a circle, the occiput is placed behind the symphysis pubis, and the face in the cavity of the sacrum: and lastly, by moving it from right to left, and depressing it, the occiput is supported under the symphysis pubis, while the left hand is applied to the perineum, and raises the head, which is disengaged from the external organs still more, and is delivered; the labor is now terminated. (*See Pl. XXXVIII. Fig.* 2.)

Second position of the feet, or right calcaneo-cotyloid position. The general situation of the child in the second position, is the same as in the first: the heels, however, look to the right cotyloid cavity, the posterior surfaces of the child being in relation with the right lateral and slightly anterior portion of the uterus.

The right hand, which is either the hand preferred, or

that of necessity, seizes the two feet, placing the fingers as in the first position, and brings them down. The child being delivered as far as the thighs, the umbilical cord is then taken and used as a handle, pulling rather on its maternal portion. The child is then seized, the accoucheur placing his hands on the haunches, and by moving it alternately from right to left, it is delivered as far as the shoulders; the arms are disengaged as before, the right hand is introduced into the vagina, two fingers are placed below the child's nose, and the opposite hand on the occiput, and by the double motion mentioned above, the head is brought into the cavity of the lower pelvis, whence it is delivered, the mechanism being the same as in the first position.

Third position of the feet, or right calcaneo-sacro-iliac position. In this position, the heels look to the right sacro-iliac symphysis, and the toes to the left cotyloid cavity: the posterior surfaces of the child along the right lateral and slightly posterior portion of the uterus: it is the opposite of the first. The child's feet are seized with the right hand: they however are not delivered immediately, but the child is turned, and thus the anterior surfaces are carried downward. The position of the child is then the same as in the second position, and the labor is terminated precisely in the same manner.

Fourth position of the feet, or left calcaneo-sacro-iliac position. The heels correspond to the left sacro-iliac symphysis, and the toes to the right cotyloid cavity: it is the reverse of the second position. The feet are grasped with the left hand; as they are delivered, the child is turned, so that the anterior surfaces are carried downward, and the labor is terminated as in the first position.

B. *Presentation of the knees.* In this species of labor the manœuvre differs but little from that where the feet present. We might pass this presentation without pointing out its characteristics, which also require some details on the application of the fillet.

The knees may be distinguished by the presence of two rounded tumors, beyond which we find two elongated parts, the thigh and the leg. In the four positions of the knees, the general situation of the child is the same as when the feet present. (*See Pl. XXXIX. Fig.* 1 *and* 2.)

In both positions of the knees, the palmar face of the hand introduced, must correspond to the anterior surfaces of the child, and the knees must be seized as they present: the feet cannot be disengaged until the knees are delivered, and the labor is then terminated as in presentations of the feet.

When it is difficult to reach and grasp the knees with one hand, a fillet is passed round the calf of the leg which is below, the two ends of which are brought out, and thus the lower extremities are easily delivered.

If the fillet cannot be applied on account of the height of the knees, the blunt hook may be used, which might even be applied on the calf of the leg which is below, and with which it may be delivered.

C. *Presentation of the breech.* All authors have admitted four different positions of the breech, but they do not agree in their distinctive marks. This difference of opinion depends on the difficulty of defining the third and fourth positions admitted by Beaudeloque. We, therefore, shall mention here but the first and second, the only ones really found in practice. In both cases we suppose the child to

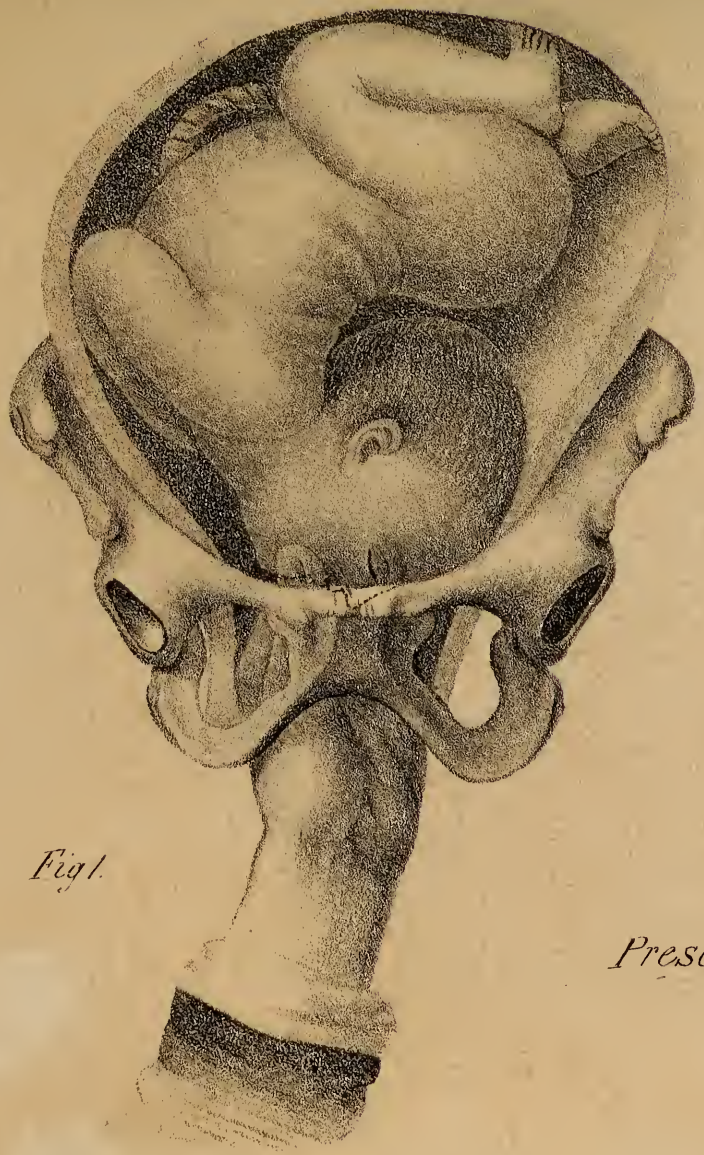


Fig 1.

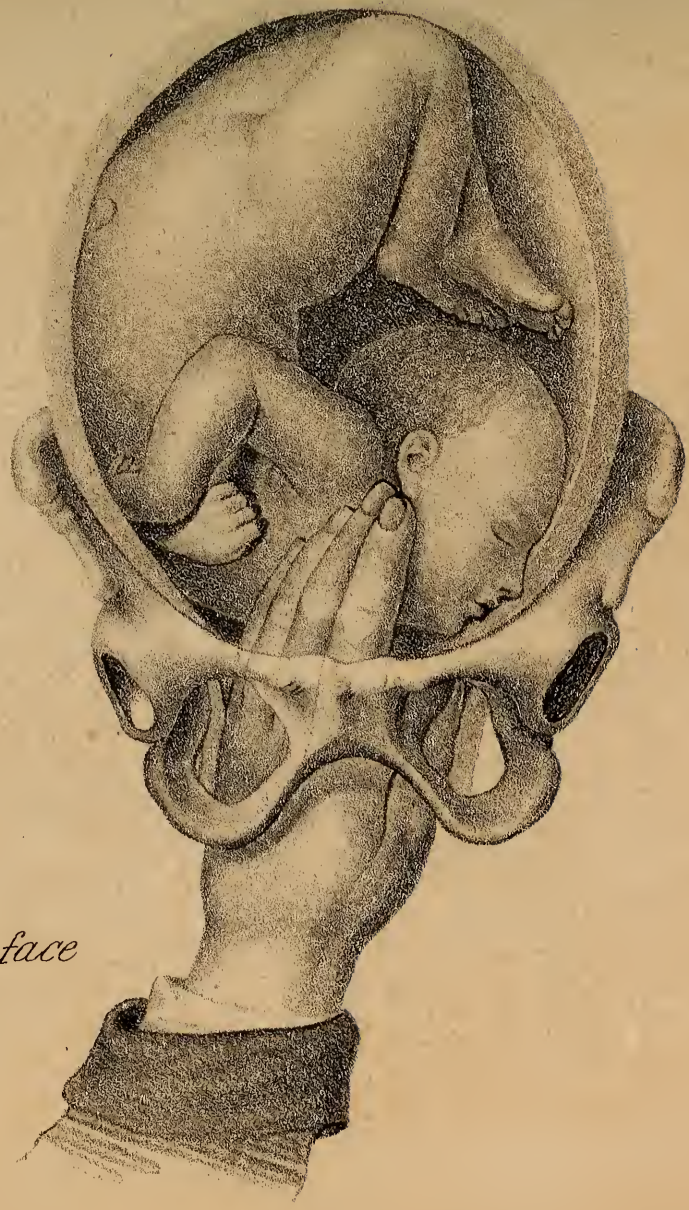
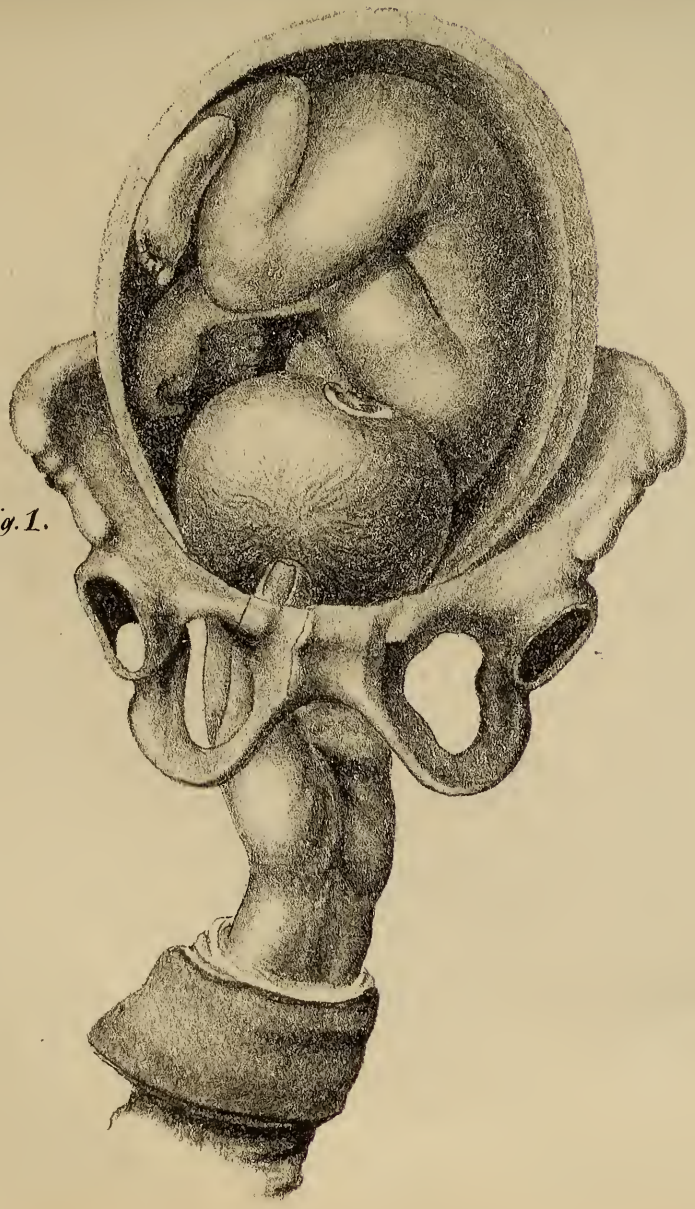


Fig 2.

Presentation of the face

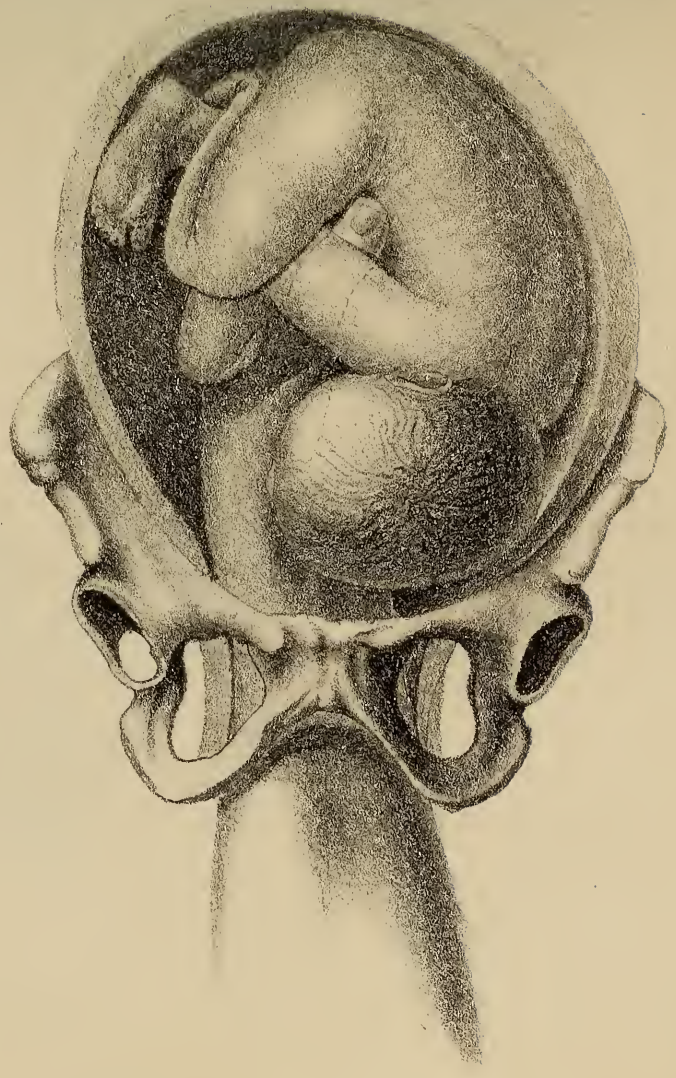
E. Bisbee del. & lith N.Y.

Fig. 1.



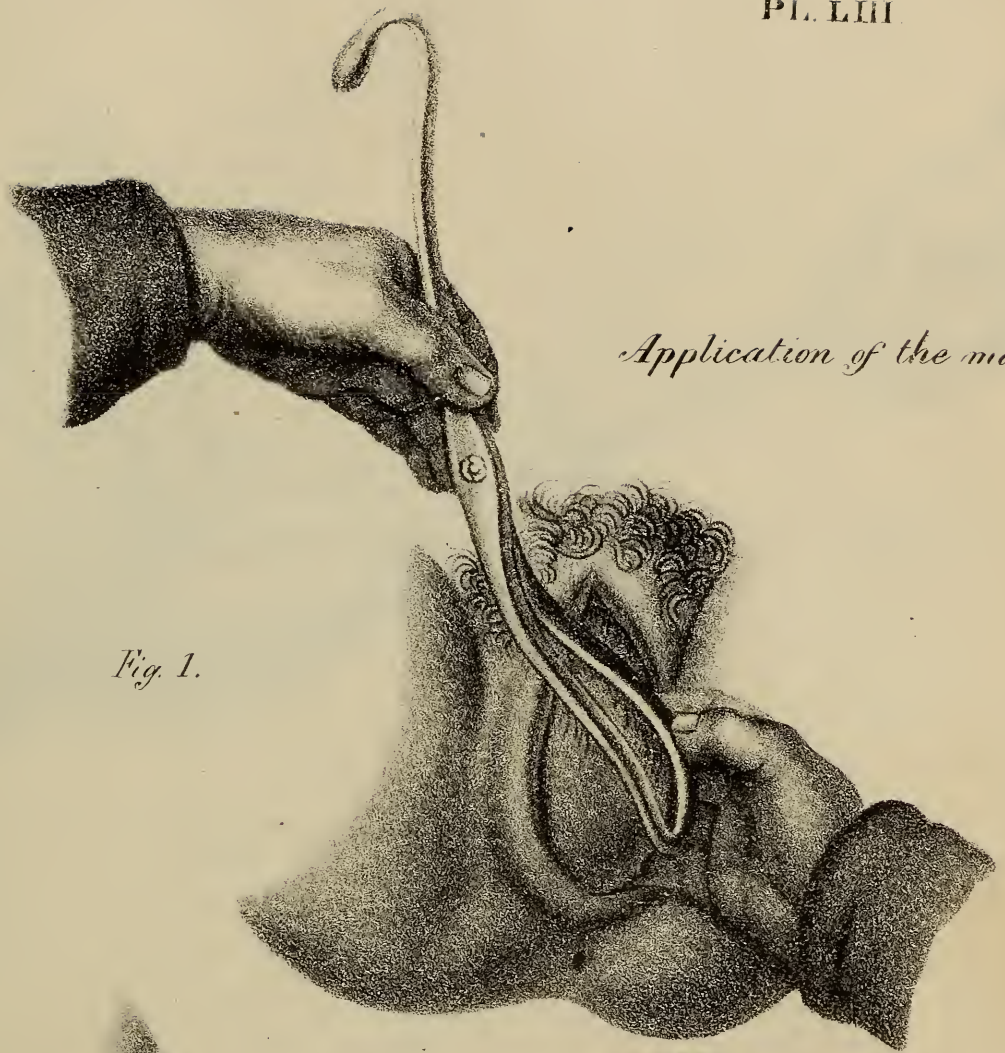
Position of the side of the head.

Fig. 2



Introduction of the hand to the feet.

PL. LIII



Application of the male branch.

Fig. 1.

Fig. 2.

Forceps applied.

Rapin del.

Lith. of Imbert.

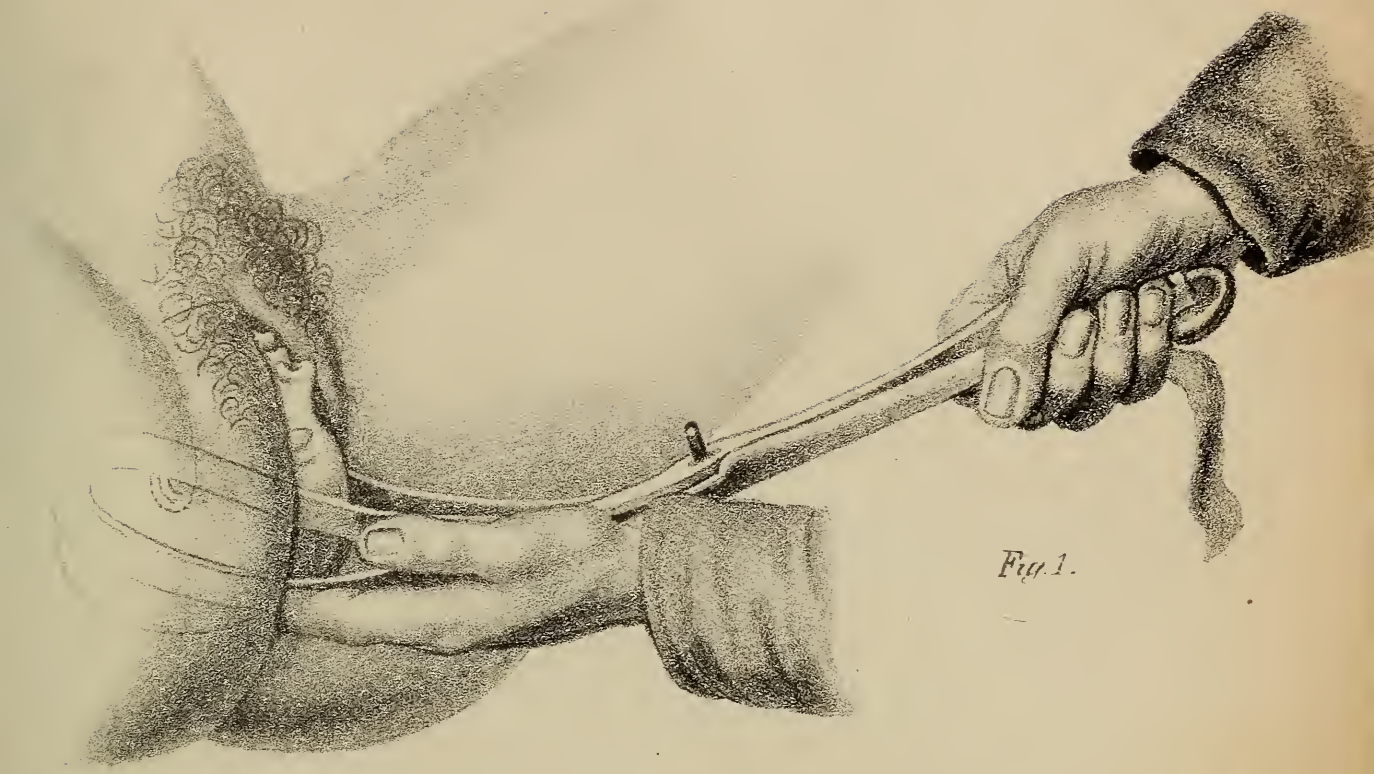


Fig. 1.

Application of the forceps the face upwards.

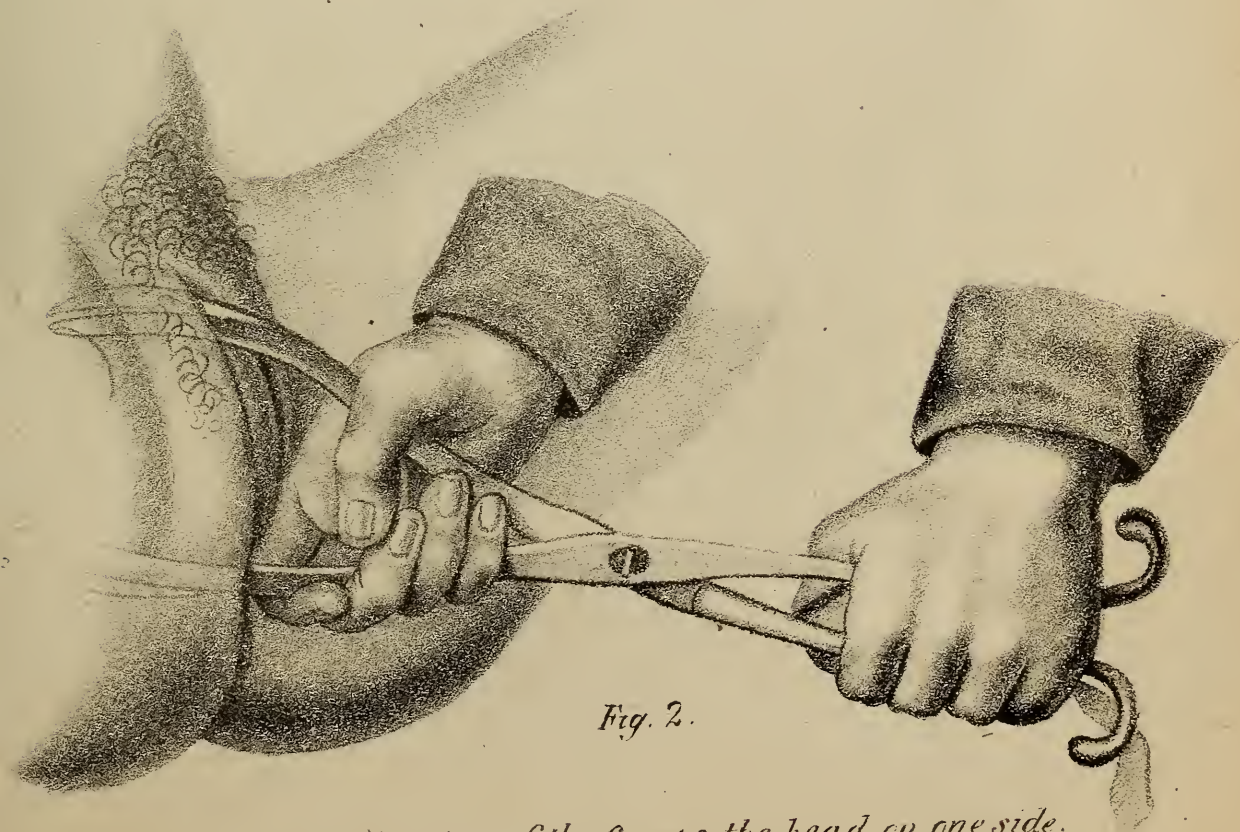


Fig. 2.

Application of the forceps, the head on one side.

Imbert litho.

Forceps applied at the superior strait.
the occiput upward.

Fig 1.

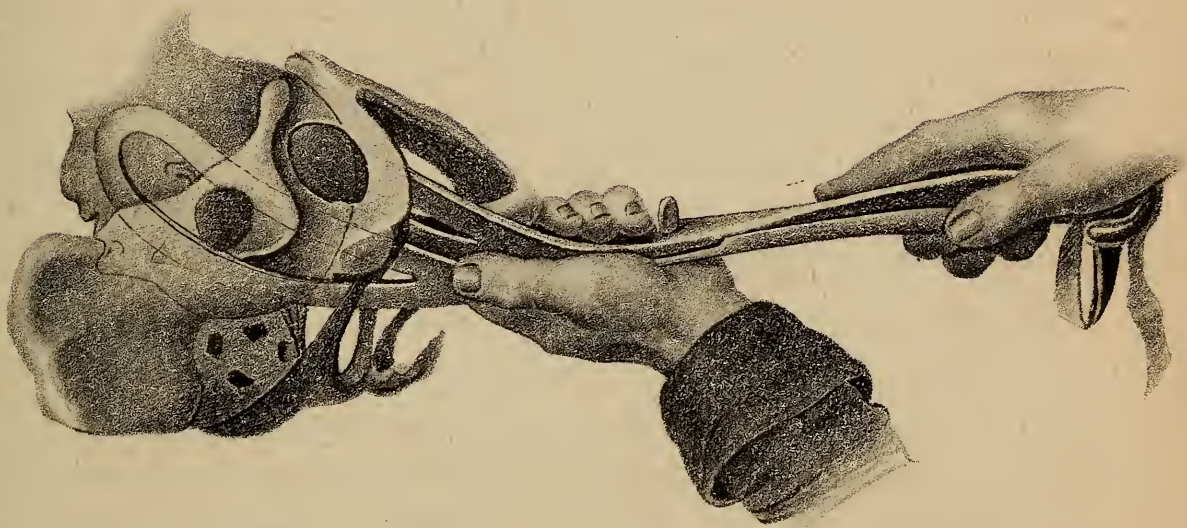
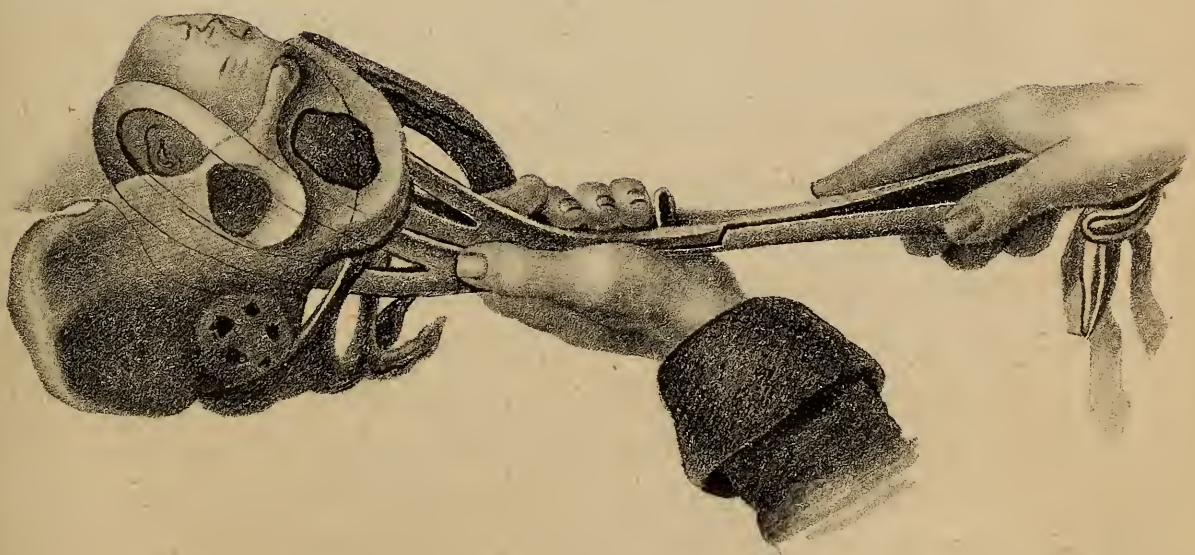


Fig 2.



ibid, the occiput downward.

E. Bisbee del & lith N.Y.

be doubled, that is, the lower limbs to be raised on the anterior part of the trunk.

The characters of a breech presentation are, a broad tumor occupying the whole extent of the strait, and more or less yielding, according to the degree of the contraction of the parts, and the length of time that the child has been engaged in the superior strait. Sometimes the two tuberosities of the ischium may be felt, but the extreme swelling of the breech often conceals them: the anus, however, is always situated in the centre of the tumefied surface; but we must be careful not to confound it with the mouth, and mistake a presentation of the face for one of the breech.

First position of the breech. The child being doubled, as we stated above, is situated so that the back and the head look directly to the left iliac fossa, and the lower limbs, which are raised on the trunk, to the right iliac fossa: the left haunch corresponds to the symphysis pubis, and the right haunch to the sacro-vertebral angle.

The left hand is carried as high as the thighs; it grasps them firmly, brings them into the cavity in order to disengage the feet and terminate the labor in the same manner as when the feet present: but if it be too difficult to execute the manœuvre in this manner, we can always slightly push them back with the left hand carried as high as the thighs: we then glide the hand towards the lower extremities, and disengage them together or separately to place the child in the first position of the feet, and terminate the labor in the mode already mentioned.

Second position of the breech. In this the situation of the child is the opposite of the first; and the right hand must be introduced to terminate the labor as in the second position of the feet. (*See Pl. XL. Fig.* 1 *and* 2.)

PRESENTATIONS OF THE TRUNK.

This section comprises those labors in which some one of the large surfaces of the child are presented: it includes presentations of the back, belly, thorax, breech, and shoulders, complicated with the appearance of the whole or a part of the arm. The termination of the labors treated of in this section forms essentially what is termed the *manœuvre.*

The fundamental character of the manœuvre relative to the termination of labor when some one of the lower extremities presents, is that the child is delivered by seizing the parts which present, and bringing them down. This is not the case, however, with the manœuvre when the trunk presents: it is impossible to bring the child through the bony pelvis as it is situated at the superior strait, for, as is commonly said, it is placed across, and it must necessarily be returned and then brought outward. In this consists the whole secret of the manœuvre, generally, in which the feet of the child are brought down to the superior strait by the shortest and easiest way. In the manœuvre where the lower extremities are concerned, the period of turning is never used: this, however, is indispensable in presentations of the trunk, as the feet of the child are always more or less remote from the superior strait, and cannot be seized until we have passed over a greater or less part of the external surface of the child. Finally, if in these presentations we examine the causes which require the employment of the manœuvre to terminate the labor, no other motive must be regarded in deciding to use it, except the unfa-

vorable position of the child, which thus prevents its free and natural delivery.

Before proceeding to mention the manœuvre particularly, we would state, that we admit only two positions for each of the presentations of the trunk.

A. *Presentation of the back.* Under this term we include several other kinds of presentations admitted by authors, which we reject, because they terminate in the same way.

In both positions of the back, the child is situated crosswise above the strait; the head is placed on one of the iliac fossæ, and the feet on the opposite one; the anterior surfaces look upward.

The distinctive marks of this presentation are, a broad glistening tumor, which presents lengthwise from right to left a prominent spine formed by the successive spinous processes of the vertebræ: on one side, the edges of the false ribs, on the other, the scapulæ, are sufficient signs to aid the accoucheur in his examination, and to indicate even the special or peculiar situation of the child.

First position of the back. The child being situated crosswise, the head rests on the left and the feet on the right iliac fossa. The right hand is introduced in the state of supination, grasps the child and turns it slightly on itself, so that the back is brought towards the symphysis pubis. The hand is then carried entirely on the anterior surfaces of the child, and after passing successively over the belly and the anterior part of the thighs, seizes the knees, and brings them and the feet towards the right cotyloid cavity, in order to place the child in the second position of the feet, to terminate the labor as in this latter. (*See Pl. XLI. Fig.* 1.)

Second position of the back. In the second position, the

situation of the child is opposite to what it is in the first, consequently, the left hand must be introduced to terminate the labor, which is done as in the first position of the feet. (*See Pl. XLI. Fig.* 2.)

In either of the positions of the back, when the feet are seized, as already directed, the child turns on itself with the utmost facility, and then only natural and easy motions are executed.

B. *Presentation of the belly.* In proportion as the situation of the child was fortunate and natural in the presentation of the back, just so is it irksome and dangerous when the belly presents. In fact, in this presentation, the child is very much bent in an unnatural direction, and if it continues so for a long time, it will be in great danger.

This presentation is easily known: the presence of the umbilical cord, of which a greater or less portion often protrudes, indicates it unequivocally, or only generally: for to know the exact position, the accoucheur must necessarily pass his finger to the right and left, in order to feel the edge of the false ribs, and the crest of the iliac bones, and also the genital organs.

In the presentation of the belly, as in that of the back, the child is situated across the superior strait, the face on one of the iliac fossæ, and the feet on the other.

First position of the belly. The child is situated across the strait, so that its head looks to the left iliac fossa, and its feet to the right. The right hand is introduced into the uterus, and placed on the right side of the child; it then passes over all the posterior surface to the feet, which are brought down separately or together into the cavity to terminate in the second position of the feet. (*See Pl. XLII. Fig.* 1.)

Second position of the belly. In this also the child is situated across the strait, but opposite to the first position. Here the left hand must be introduced, and placed in the same way as in the first position: it terminates like the first position of the feet. (*See Pl. XLII. Fig.* 2.)

It often happens that only one foot can be brought down, the other being too far to be reached: in this case, a fillet must be tied upon the foot which is delivered, to keep it from returning, and the same hand must be introduced again in search of the other foot, which should be brought into the cavity in the same manner as the first was.

C. *Presentation of the chest or thorax.* In this presentation, the general position of the child is exactly the same as in the presentation of the belly: the same unnatural curve exists, the same danger to the child, and the same difficulty in the manœuvre. But as the feet are farther from the strait, and as the head is a little nearer, some practitioners have advised to turn by the head, which would thus be brought into the cavity, instead of seeking for the feet, which it is very difficult to reach. We do not absolutely reject this method, but we are far from adopting it exclusively, for the following reasons. When the membranes are not ruptured, nor the waters evacuated, or shortly after the escape of the waters, as the uterus has not had time to contract, we can conceive it possible to bring the head to the brim, and then to leave it to the contractions of the uterus, which in fact will soon force it into the cavity, and expel it. If this could be done in every case where the trunk presents, it would doubtless be preferable to turning by the feet: but it is inadmissible in case of inertia of the uterus, hemorrhage, convulsions, or any other more or less formidable symptoms.

In turning by the feet, we are always certain to terminate the labor, when they are seized properly, since we direct the labor: there is not the same advantage in turning by the head, for independent of the difficulty of attaining it, and of bringing it to the superior strait, the slightest defect in the relation between it and this latter, may prevent the termination of the labor. How cruel the alternative, to be obliged sometimes, after a long and painful manœuvre, to turn by the feet!

First position of the chest. The head is on the left, the feet on the right of the pelvis. The right hand is introduced, as in the first presentation of the abdomen, and we search for the feet, which is very tedious, as they are distant. But when once in the cavity, they are easily disengaged, either separately or together, and the labor is terminated as in the first presentation of the feet. (*See Pl. XLIII. Fig* 1.)

Second position of the chest. The general position of the child is the same, but the head is on the right, the feet on the left. The left hand searches for the feet, brings them into the cavity, and the labor is terminated as in the first presentation of the feet. (*See Pl. XLIII. Fig.* 2.)

D. *Presentation of the haunches, or sides of the child.* Under this general term, we include the presentation of the haunches and that of the ribs; because the side, properly speaking, presents no determinate character, and in order to recognize it, we are always obliged as a guide to go to the haunch, which is sometimes hard to be distinguished. Finally, when this last part presents, there is a small rounded tumor, which presents nothing characteristic, hence we must pass the finger sometimes backward, sometimes forward, to discover first, the spinous processes of the last

lumbar vertebræ; second, the genital organs of the fetus, and also the crest of the ilium.

But beside the general characters of the presentation of the haunch, we must mention also the peculiar marks of each, so as not to confound the right with the left, which would necessarily cause much uncertainty and confusion in the manœuvre.

First position of the right haunch. The child is situated crosswise, as in all the presentations of the trunk; its posterior surface looks to the symphysis pubis, and the anterior to the sacro-vertebral prominence. The head is situated to the left, the feet to the right. The right hand is introduced in a state of supination; after gently pushing back the child, it glides successively over the whole anterior surface to the feet, which are seized and easily brought down into the cavity, and the labor terminates as in the second presentation of the feet.

Second position of the right haunch. The child lies crosswise, the head to the right and the feet to the left: the posterior surface is backward and downward, the anterior forward and upward. The left hand is introduced in a state of pronation; it gently pushes back the child, glides over the whole anterior surface to the feet, which are slowly brought into the cavity, to facilitate the turning of the child on itself. Too much haste would infallibly injure the success of the manœuvre. (*See Pl. XLIV. Fig.* 1 *and* 2.)

First position of the left haunch. In this presentation, the general position of the child is the same as in the first position of the right haunch: as in this latter, the child's head rests on the left iliac fossa, and the feet look to the right iliac fossa; but they differ in this position, as the anterior surfaces of the child which are turned towards the pubis, are upward,

and render the manœuvre as difficult as that of the second position of the right haunch, to which it is very analogous as respects the special situation of the fetus. To perform it, the right hand is introduced, and after pushing back the child, it is bent on its anterior surface, and passes over it to the feet; these are then brought towards the superior strait, by pulling principally on the most remote, in order to favor the motion of turning the child, by which the anterior surfaces are brought downward. When the feet are once in the cavity, the labor is terminated as in the second position of the lower extremities.

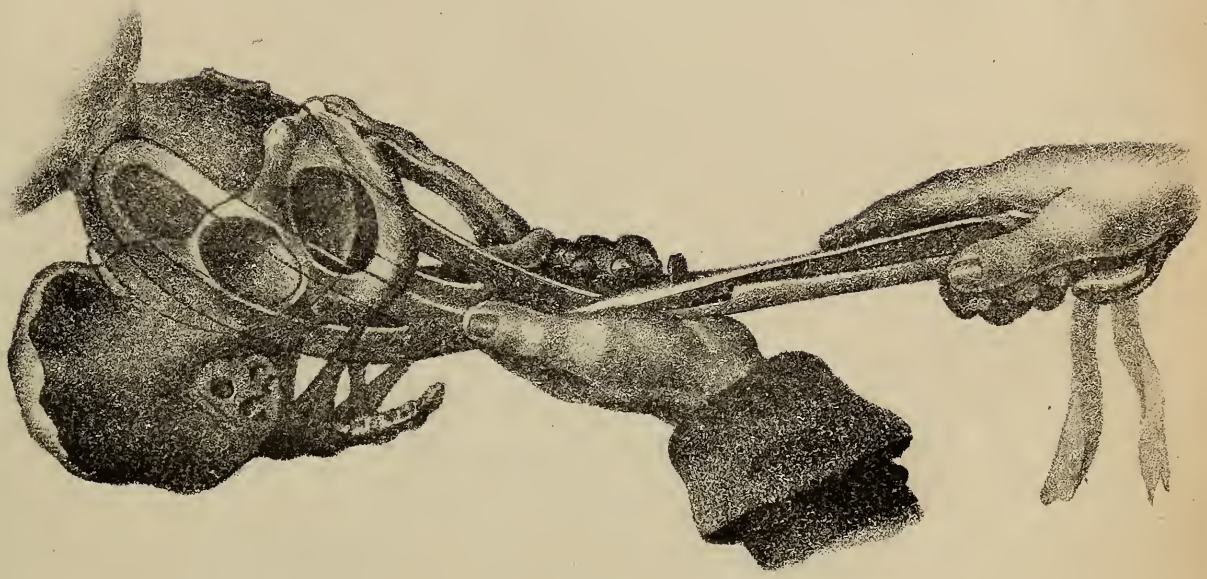
In this position, as in the second presentation of the right haunch, we must proceed very slowly and carefully, if we wish to succeed; for if too much precipitation or violence be used, the labor cannot probably be terminated without danger to the child, and frequently also to the mother.

Second position of the left haunch. This position has the most perfect analogy with the first of the right haunch, as respects the general position of the child; the head, however, is to the right of the pelvis, the feet to the left, the anterior surfaces of the child looking downward.

The left hand is introduced, the child is gently pushed back, and then the hand is passed over the anterior surface to the feet, which are seized, and the labor is terminated as in the first position of the feet. (*See Pl. XLV. Fig.* 1 *and* 2.)

E. *Presentation of the shoulder, complicated with the appearance of a part or the whole of the arm.* This presentation differs from the preceding, not only on account of the presence of the shoulder, the slightly marked characters of which have a very great analogy with the other parts of the child, but particularly on account of the appearance of

Application of the forceps the head on one side



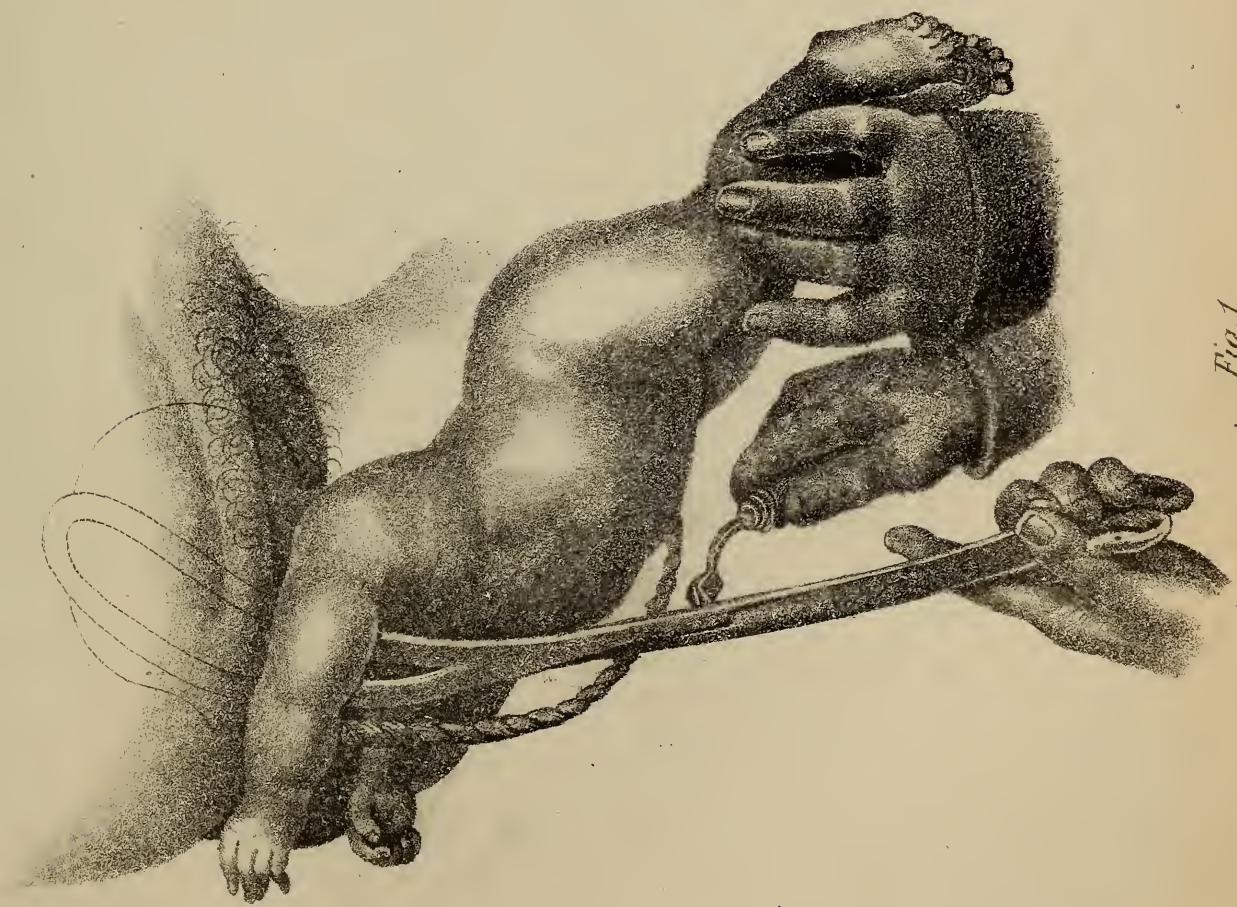


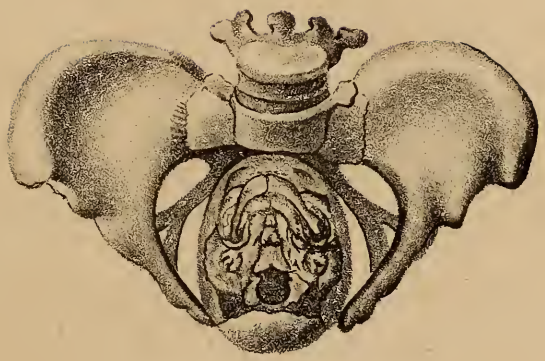
Fig. 1.

Application of the forceps, the trunk out.

Lithe. of Imbert N.Y.

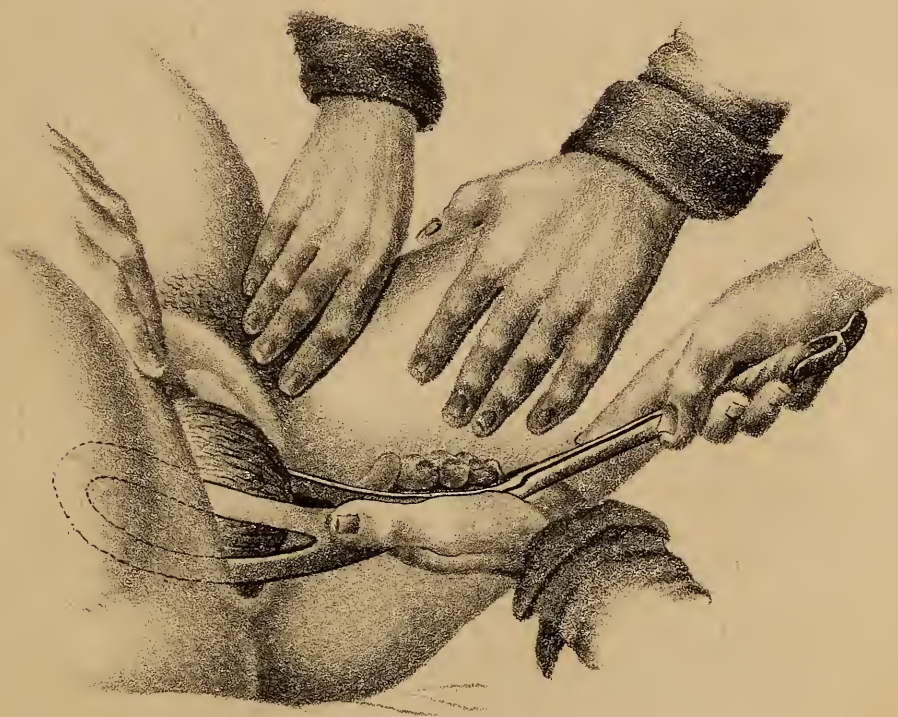
First incision in symphysiotomy.

Fig. 1.



Relations of the head with the pelvis at its expulsion.

Fig. 2.

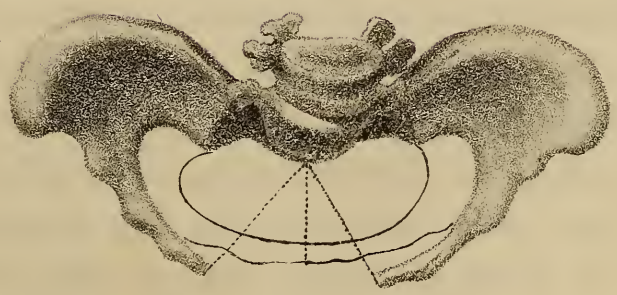


Delivery of the head with the Forceps.

Fig. 1.

Separation in a deformed but regular pelvis.

Fig. 2.



Separation in a deformed and irregular pelvis.

Drawn & Lith. by D. G. Johnson New York.

the arm by which the termination of the labor is always very much impeded.

In order to proceed methodically, we shall first describe the presentation of the shoulder as if the child had no arm. It is the only way to form a correct idea of this presentation and of the manœuvre proper for it.

The general characters of the presentation of the shoulder are, a small shining tumor, rather similar at first view to that presented by the elbow, the knee, the thigh, and even the breech; its special characters have no peculiar marks. But if the index finger be carried a little farther, we soon discover on one part the scapula, and on the other the clavicle, as also the upper ribs, which confirm the special character of the presentation of the shoulder: we then have only to determine the proper position of the child, and also that of each shoulder.

First position of the right shoulder. The general position of the child is here the same as in the first position of the right haunch, that is, the head corresponds to the left, and the feet to the right; the back of the child looks to the pubis, and is directed a little upward, while the anterior surfaces have an opposite direction.

The right hand is introduced in the state of supination, and slightly crowds the shoulder backward by acting upon the point of support, then glides over the anterior surfaces of the child to the feet, which are grasped separately or together, to bring them into the cavity, in order to direct the heels towards the right cotyloid cavity, and thus to terminate the labor by the second position of the feet. (*See Pl. XLVI. Fig.* 1.)

Second position of the right shoulder. Although the general position of the child is the same here as in the preceding,

its peculiar situation differs widely. The head, it is true, is situated on the right iliac fossa, and the feet correspond to the left iliac fossa: but as the back of the child is behind, and the anterior surfaces upward, this position and the first of the left shoulder, are the most difficult for the manœuvre, as may easily be understood by the following explanation, but particularly by looking at the parts. (*See Pl. XLVI. Fig.* 2.)

The left hand is introduced in a state of pronation, crowds back the trunk of the child, passes in the same position over the anterior surfaces to the feet, which must be grasped together, pulling most upon the farther foot in order to favor the turning of the child downward, and thus to bring it to the first position of the feet, to terminate the labor in the same manner. In this manœuvre the utmost moderation must be used.

First position of the left shoulder. This position differs from the preceding only in the situation of the head, which is on the left iliac fossa, and in that of the feet, which correspond to the right iliac fossa.

The right hand is required: it is introduced in the state of pronation, glides over the anterior surfaces of the child to the feet, which must be seized together to bring them into the second position of the feet, pulling more particularly on the right foot, which is the more remote, in order to favor the motion of turning downward, and the labor is terminated as in the second position of the feet. (*See Pl. XLVII. Fig.* 1.)

Second position of the left shoulder. This is perfectly analogous with the first of the right shoulder as to the general position of the child; as in this latter, in fact, the anterior surfaces of the child are downward, which faci-

litates the termination of the labor, as may have been ascertained in the first position of the right shoulder.

In the second position of the left shoulder, the child's head rests on the right iliac fossa, and the feet correspond to the left: its posterior surfaces look upward and a little forward, and the anterior surfaces downward and a little backward.

The left hand is introduced in a state of semipronation as far as the shoulder, which is crowded back, as is also the trunk of the child, rotating it slightly on itself, in order to bring the anterior surfaces downward: the hand, placed in this position, then glides over these same surfaces from right to left to the feet, which are grasped separately or together, and brought towards the cotyloid cavity of the left side; the labor terminates as in the first position of the feet. (*See Pl. XLVII. Fig.* 2.)

Presentation of the shoulder, complicated with the appearance of the whole or a part of the arm. Among the ancients, and even in modern times, when one of the upper limbs appeared, or a part or the whole presented out of the vulva, all the assistants were affrighted; the accoucheur was terrified, persuaded that the woman could not be delivered unless her offspring were mutilated: hence, the limb which presented, was twisted or amputated at its articulation with the trunk, and the child thus dismembered, was afterwards delivered by the feet, and surviving for a longer or shorter period, a punishment as cruel as it was useless.

Practitioners were justly alarmed with the awful consequences of this manœuvre, and endeavored to substitute for it a process, which, although not so fatal, was not more practicable. In fact, what was advised? To return the extremity which appeared, and then to seek the feet. But

when the uterus has contracted powerfully on the child, this manœuvre is useless, and even impossible, and frequently dangerous; for the limb generally re-appears at the first contraction of the uterus, and these repeated efforts must necessarily fatigue and irritate the parts of the female, which being swelled and tumefied, may thus impede the termination of the labor. What then must be done? We must not return the arm to seek for the feet; but the manœuvre must be performed as if there was no arm, as if the child was a cripple: we must consider the appearance of the extremity only as an unfortunate circumstance, which in fact renders the termination of the labor complex, but does not prevent it: for it is certain, as Deleurye had demonstrated, that, as soon as the child goes towards the base of the uterus, the arm re-ascends with the body, and disappears.

The following are the principal points to be regarded in the manœuvre where the arm appears: first, when the whole or a part of the arm has appeared for a short time, and the parts of the mother are neither tumefied nor inflamed, we must proceed immediately to terminate the labor, in the manner to be mentioned hereafter, when the exact position of the child is determined by inspecting the limb which presents; second, but if the arm has been delivered for a long time, and the delivery of the child has been attempted by drawing it downward, if the parts of the female, irritated by this imprudent manœuvre, are very much inflamed, it is to be feared, that the neck contracting powerfully on the arm of the child, may very much impede the termination of the labor. We must then employ venesection, baths, fumigations, and all the means which are disposed to soften the parts of the female, before proceeding to the manœuvre;

third, if the genital organs are simply tumefied, swelled, but not inflamed, we may proceed to the manœuvre without regarding this circumstance; in this case, a skillful accoucheur can overcome by his address and perseverance the disadvantage of its position; fourth, sometimes the arm of the child is not only tumefied and red, but even bruised, and the epidermis is detached; this would lead us to believe the child dead, and the arm gangrenous: this opinion is often erroneous, as the arm may be partly sphacelated, and the child not entirely lifeless; but the accoucheur should terminate the labor as quickly as possible, in order to pay that attention to the child which its situation requires; fifth, but if the arm be more or less ecchymosed and sphacelated, and appears to be attached to the trunk only by a fold of the integuments, in consequence of the violent tractions upon it, as the death of the child is then certain, its delivery should not be attempted, until the arm is separated from the trunk, to prevent this separation from taking place in the uterus, and to avoid the blame of an accident committed by another; sixth, finally, if when called upon to terminate a difficult labor, the peculiar character of which may not be mentioned, you should discover by touching, that it is a shoulder presentation, but that the arm is wanting, if you have reason to think that it has been removed, you must not proceed to the manœuvre, until the deficiency of the arm is mentioned, in order that you may not be accused of mutilating the child. In all these different cases, before proceeding to the manœuvre the child must be wet, by pouring water on the most apparent part of the arm.

OF THE MANŒUVRE, IN CASE OF ANY PRESENTATION OF THE SHOULDER, ATTENDED WITH THE APPEARANCE OF THE WHOLE OR PART OF THE ARM.

First position of the right shoulder, the arm appearing. After determining the exact situation of the child, which is in the first position, by inspecting the presenting arm, a fillet is applied to the latter, which is held by an assistant, standing on the right of the accoucheur. The right hand is then introduced in a state of supination to the axilla of the child, and the trunk is pushed back; the same hand then proceeds along the anterior surfaces to the feet, which are seized and brought towards the inner part of the right iliac fossa, to terminate as in the second position of the feet. When this manœuvre is properly performed, the arm re-enters, and even entirely disappears. But when the child is about to be delivered, the accoucheur should take hold of the fillet upon the arm, and act upon this also, while the trunk is passing outward. (*See Pl. XLVIII. Fig.* 1.)

Second position of the right shoulder, the arm presenting. We proceed at first in this position as with the preceding; that is, after attaching a fillet to the arm which presents, the left hand is introduced in a state of pronation to the trunk of the child, which is pushed back gently, in order to pass over the anterior surfaces to the feet, which must be grasped together, and not separately, being careful to pull rather upon the farther one, in order to facilitate the turning of the child below, and the labor is terminated as in the first position of the feet. (*See Pl. XLVIII. Fig.* 2.)

When the child is turned, we should be careful to pass

the fillet from left to right, to preserve the relation of the arm with the trunk, which has turned on itself. If this should be neglected, the arm would be crossed under the trunk, and might perhaps be fractured during the termination of labor.

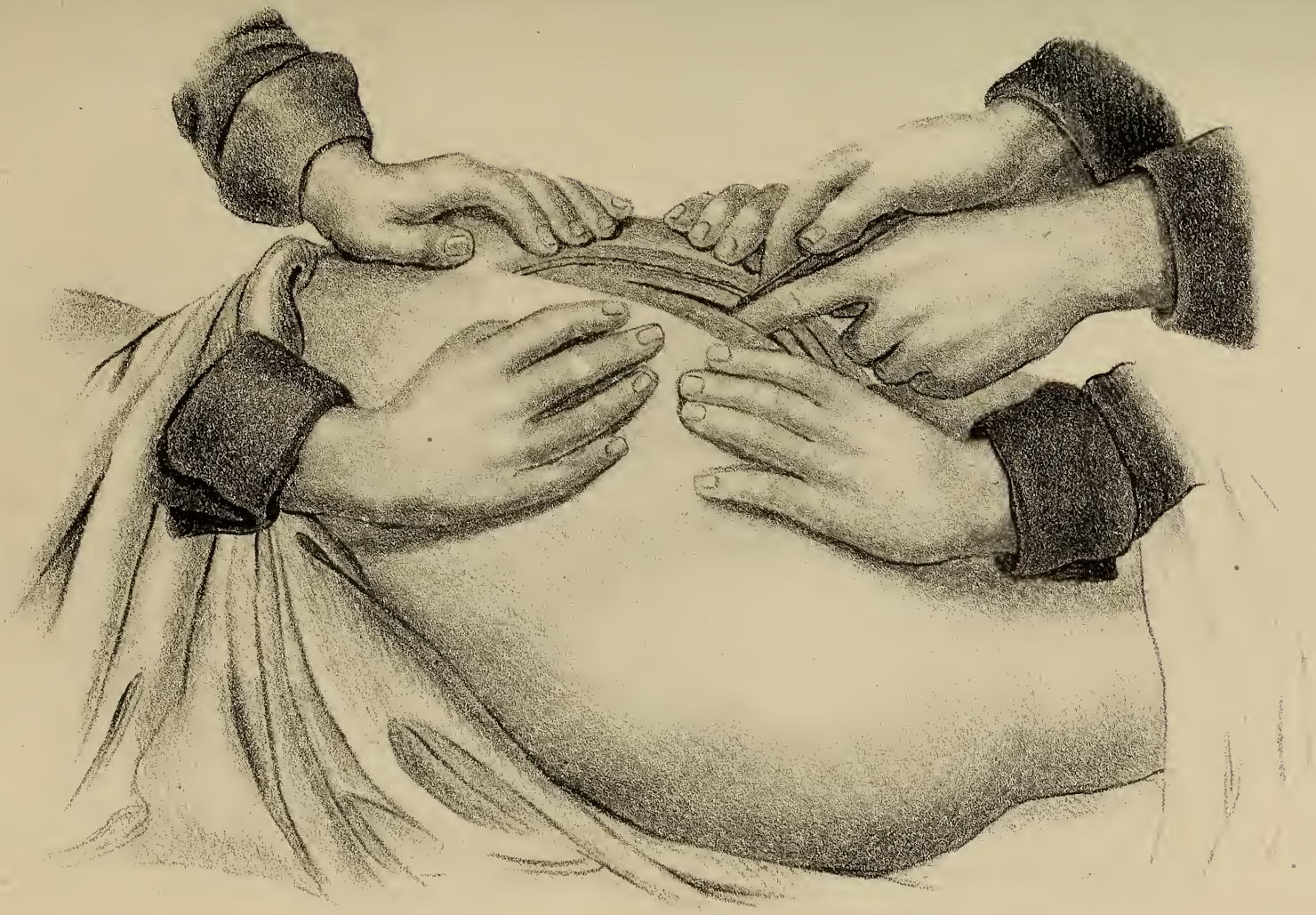
It may perhaps appear strange, that in treating of the manœuvre in particular, relative to the different presentations of the trunk, we have neglected the third and fourth positions, generally admitted by all authors since Beaudeloque. In fact, this innovation demands some explanation on our part. We must then declare that these positions are more imaginary than real, and in fact do not exist: those practitioners who have admitted them, have never seen them; and the simple relation of the parts prove them to be impossible. In fact, we can easily imagine the child to be placed across the upper strait, but we cannot imagine how it can preserve its position there from before backward: therefore, why overload the science with useless details, and the art with operations which will never be performed. Finally, it is time that the science of obstetrics should be freed from certain trammels which oppose its perfection: for these reasons we have rejected the third and fourth positions. Farther, in regard to the termination of labors in which any part of the external surfaces of the trunk of the child presents, we would observe, that in these different presentations, the accoucheur must consider it a principle, always to bring the anterior surfaces of the child below. The object of this fundamental law is, to place the child always in the first or second position of the feet, which is the only and the true method of terminating the labor.

Presentation of the head. The manœuvre of the different

presentations of the head, differs from those of the trunk, or even of the lower extremities. They are similar in appearance, but differ in a manner not to be misunderstood. The presentation of the head, for instance, does not in itself require a manœuvre, since, strictly speaking, the labor may terminate naturally, whatever part of its external surface may present at the brim. Hence it follows, that since the general principles which have guided us in stating the manœuvre of the presentations of the trunk or the lower extremities, cannot apply to that of the head, the latter cannot be explained without considering anew the reasons which require its use, and also the mode in which it is performed.

In all presentations of the head, we should doubtless attempt to restore it to its natural position, by placing the vertex so as to bring it constantly towards the centre of the pelvis, by which the labor may afterwards be left to nature. But in order that this principle may be strictly true, we must suppose the uterus still possesses the power of contraction: and what should we gain by this mode of treatment in a feeble woman, who appears just expiring, and whose life is threatened by severe hemorrhage or horrid convulsions? Far from losing precious time, we must on the contrary hasten to terminate the labor.

Thus, whatever may be the situation of the head at the brim, and when its unfavorable position completely prevents the termination of the labor, a skillful and prudent accoucheur should attempt every known means of bringing the occiput to the centre of the pelvis, should solicit contraction of the uterus, and then leave the termination of the labor to nature. But if this manœuvre cannot be executed, if the head, propelled by severe contractions of the uterus, tends



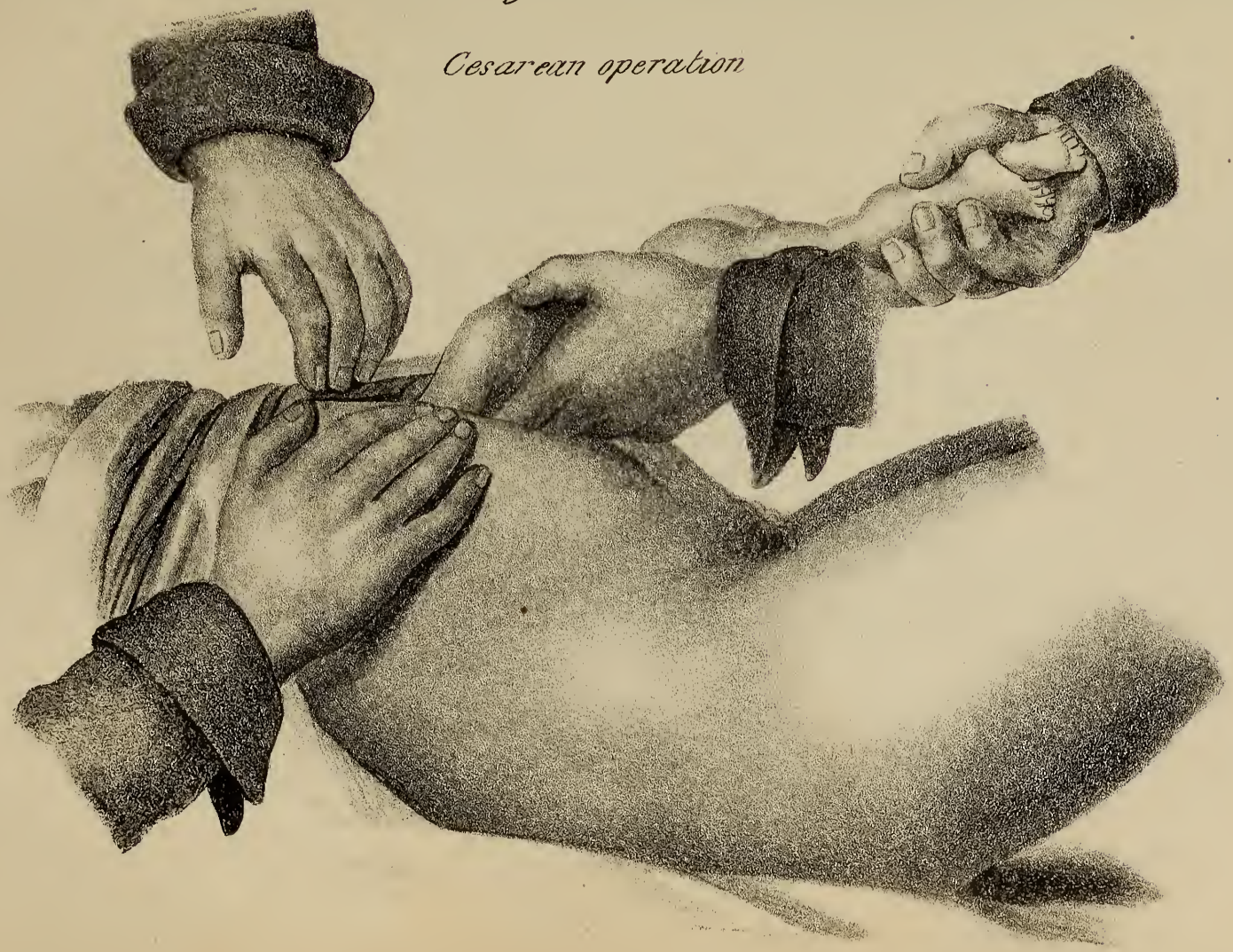
Cesarean operation. Process of the Ancients.

J. & W. Bisbee del. & lith. NY

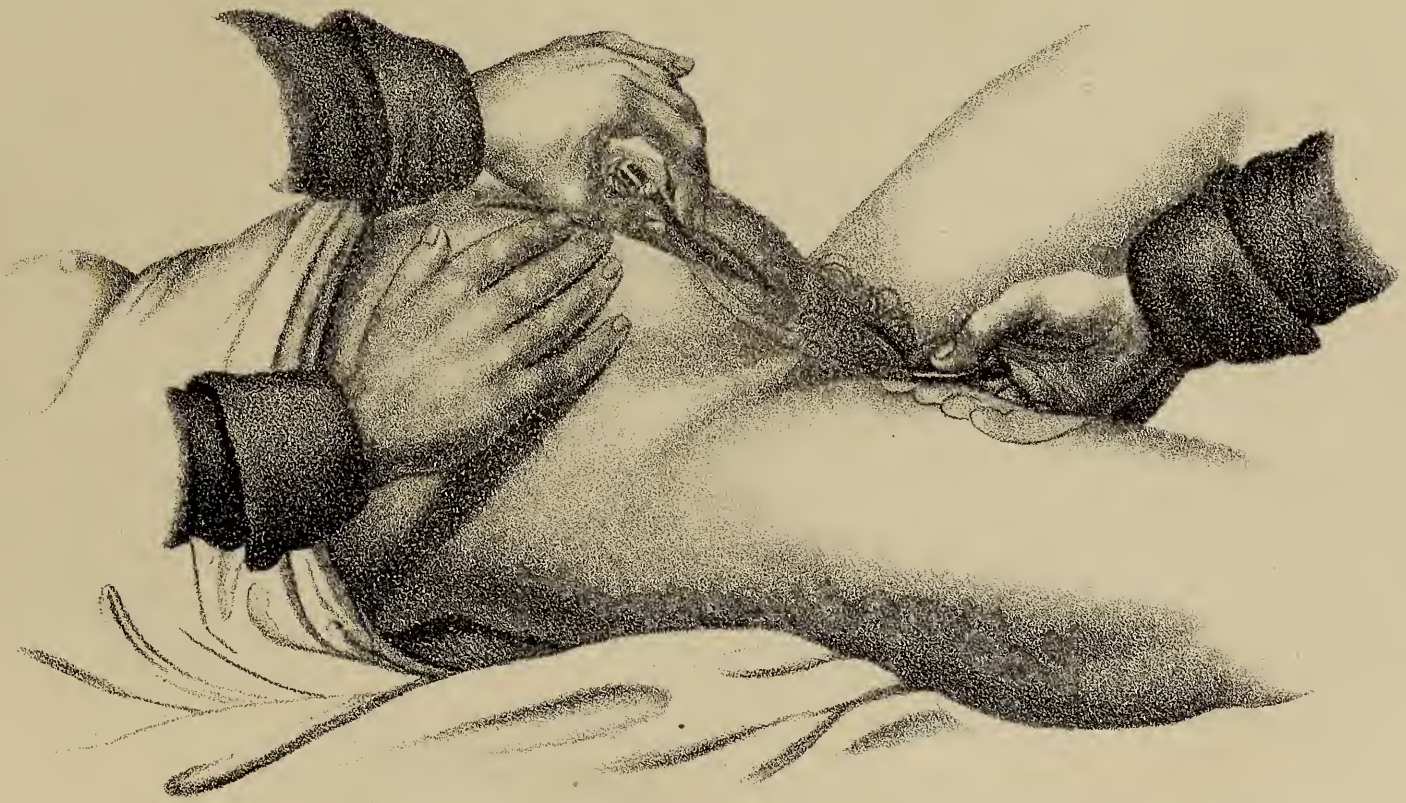
Delivery of the Child.

Cesarean operation

PL. LXII



Cesarean Operation.



Passing the cord for delivery.

Fasio del.

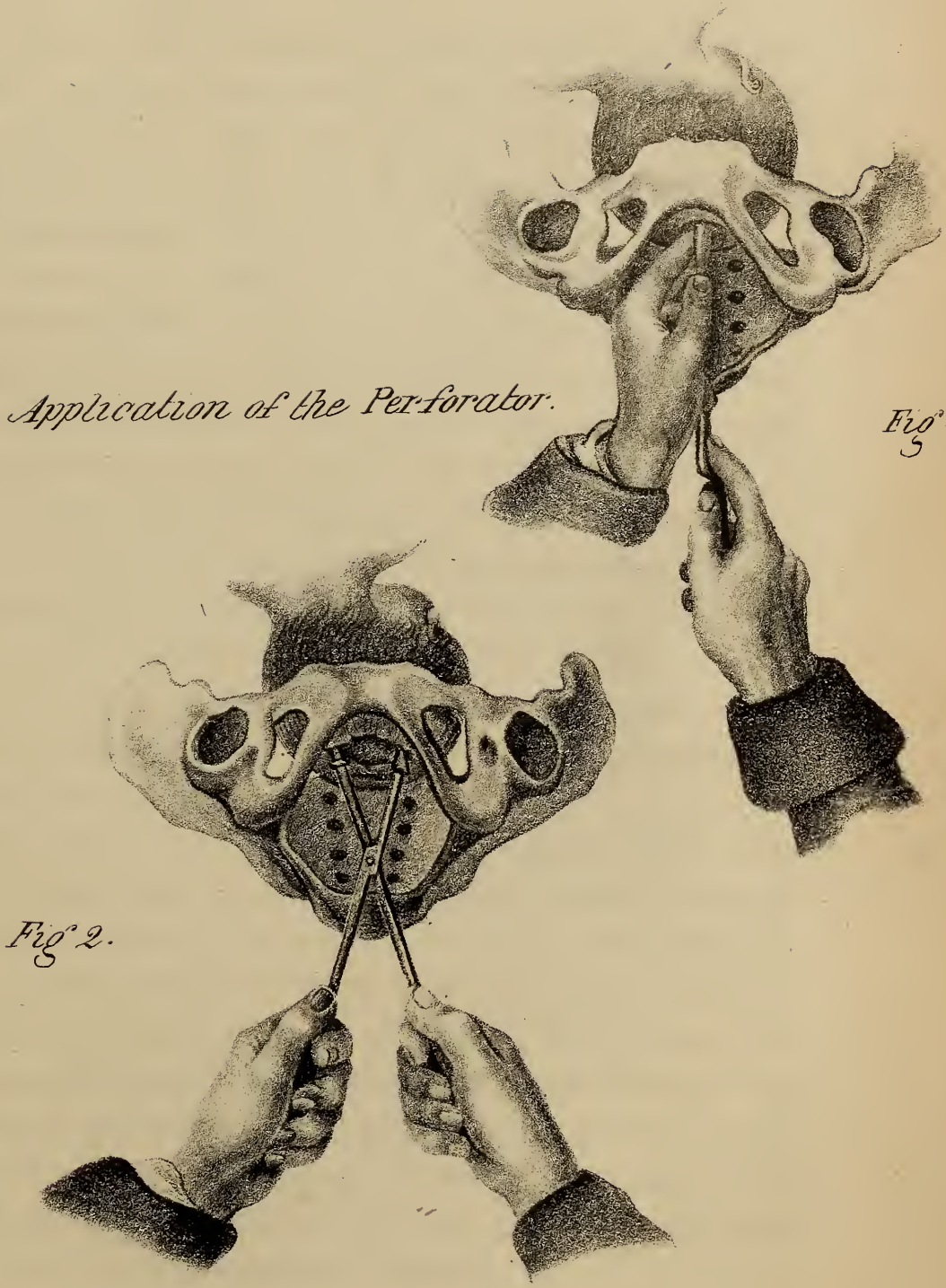
Lithog. of D.G Johnson. N.Y.

Beaudeloque's Incision

Lauvergeat's Mode.

J. Bisbee del. & lith. N.Y.

PL. LX



Application of the Perforator.

Fig^e 1.

Fig^e 2.

Application of Smellie's scissars.

more and more to an unfavorable position, we must not hesitate: the head must then be pushed back, and be placed on one of the iliac fossæ; we must bring down the feet, and terminate the labor as we have mentioned when speaking of the feet presentation.

The same course must be pursued when severe and alarming symptoms imminently threaten the lives of the mother and child. Here we must not depend upon the resources of nature, and even if the occiput presents, the same course must be followed as in the preceding case.

The manœuvre relative to the different positions of the head is remarkable in this respect, that the same or nearly the same manual operation is required: thus, whatever may be the position of the head at the brim, we must always direct the occipital portion towards one of the iliac fossæ, and then carry the hand along the anterior surfaces to the feet, which are brought into the cavity, thus turning the child on itself, to terminate by the manœuvre of the feet.

We have distinguished five presentations of the head, viz: first, the vertex, or sinciput; second, the occiput, or the summit; third, the face; fourth and fifth, the temples or the auricular regions.

A. *Presentation of the vertex, or sinciput.* When the vertex or sinciput presents at the brim, it may be recognized by the presence of a broad, rounded, hard tumor, in which, at an interval of three fingers' breadth, the two fontanelles, the known form of which and direction, as also the sutures and their direction, present the practitioner with the modes of determining the peculiar position of the head.

We must remark, here, that in every presentation of the head, the body of the child is as it were folded on itself, and thus is bent in the most natural position.

First position of the vertex. In this position, the sinciput occupies the whole superior strait; the occiput is to the left, and the face to the right.

The left hand is introduced, and pushes back the head, which is raised with the ends of the fingers, and placed on the left iliac fossa. The hand then glides over its anterior surfaces, directing the fingers successively on the left side of the child, the shoulder, the groin, to arrive at the feet, carries them together or separately into the vagina, and thus the labor terminates like the second position of the feet.

If, in this manœuvre, as well as in all those which involve the different presentations of the head, the latter is situated too near to the orifice, and consequently to the brim, and should impede the disengagement of the feet too much, we must first attempt to push it back with the palm of the hand which is introduced already, or with the fingers of the other hand, which should be carried as high as the head. If this first mode is not sufficient, and if the head, wedged as it were in a part of the strait, presents an almost invincible resistance to the extraction of the feet, we must then use an instrument termed a *repoussoir*. The mode of using it is as follows.

A fillet is first applied on one or both of the child's feet: we then introduce to the child's head the instrument mentioned, pull strongly on the feet and carry them outward, while we push the head inward, turn the child without difficulty, and terminate the labor, which would otherwise present difficulties sometimes insurmountable. (*See Pl. XLIX. and L. Fig.* 1 *and* 2.)

This course should be adopted in all presentations of the head generally, where it is really difficult to disengage the feet, or as is commonly said, to turn the child.

Second position of the vertex. The child is situated as in the preceding position; the occiput, however, is to the right and forward, and the face to the left and backward.

The right hand is introduced and carried to the left side of the pelvis, to push the head towards the right iliac fossa. The fingers are then passed towards the left side of the child's head, the shoulder, and the haunch to the feet, which are seized together or separately, brought into the cavity, and the labor is terminated as in the first position of the feet.

Third position of the vertex. In this position, the occiput looks toward the right iliac fossa, and the face to the left cotyloid cavity.

In this case the manœuvre is executed with the right hand, which is introduced to the head, embraces it, carries it on the right iliac fossa, proceeds along the anterior surfaces to the feet, which it brings into the cavity, and it is terminated as in the first position of the feet.

Fourth position of the vertex. Here the occiput looks to the left sacro-iliac symphysis, and the face to the right cotyloid cavity.

The left hand is introduced, and carried, as in the preceding positions, along the anterior surfaces to the feet, which are brought behind the cotyloid cavity of the right side, and the labor terminates in the second position of the feet.

B. *Presentation of the occiput.* This presentation, which is essentially natural, requires manual assistance only when serious symptoms frustrate the exertions of nature, and endanger the life of the mother and child. The situation of the head at the upper strait is the same as in the most

natural labor, and therefore we shall omit repeating i for the four positions of the head.

The characters which mark the presentation of the occiput cannot be mistaken, when the hairy scalp is not tumefied, and the sutures, and especially the fontanelles, are as it were exposed. But this is not the case when the head has been engaged for a long time, and is closely embraced in the strait, and is therefore more or less swelled, and thus conceals the occiput from the researches of the index finger, for it is then almost impossible to discern it through the very large swelling which covers it. Hence the presentation of the occiput may be determined by negative signs; by the absence of the marks which characterize the other presentations of the head.

First position of the occiput. The left hand is introduced, and raises the head to carry it on the left iliac fossa; the feet are then sought for, and the labor is terminated as in the second position of the feet.

Second position of the occiput. In this case, the manual is executed by the right hand, as in the second position of the vertex, to terminate as in the first position of the feet.

Third position of the occiput. The right hand pushes the head upon the right iliac fossa, and grasps the feet to terminate the labor as in the first position of the feet.

Fourth position of the occiput. As in the fourth position of the vertex, the left hand seeks the feet, to terminate the labor as in the second position of the feet.

D. *Presentation of the face.* The most certain and most palpable characters commonly mark this region, viz., the nose, the mouth, the edges of the orbits, &c. If any presentation of the head requires the employment of all possible means to restore it to its natural position, it is undoubtedly

this. The forced situation of the child, the danger which threatens it, the impossibility of passing fortunately through the straits of the pelvis in its present situation, oblige us to raise the chin on the chest, to place it more properly, or to seek the feet immediately. The first process is undoubtedly preferable, because if the head is once in a proper position, the rest of the labor may easily be performed by the resources of nature alone. But if this cannot be accomplished, the child must be turned, and the feet brought down.

First position of the face. The head is placed so that the forehead, not the occiput, corresponds to the left, and the chin to the right. In this position, the left hand must be introduced towards the right side of the uterus, push the head upon the left iliac fossa, correcting as much as possible the forced and unfavorable situation of the child's head: we then glide the hand along the anterior surfaces to the feet, which are carried towards the right side of the pelvis, and the labor is terminated as in the second position of the feet.

Second position of the face. The situation of the head is the opposite of the preceding: as for the rest, the same indication is to be performed with the right hand.

Third position of the face. Here the forehead corresponds to the right sacro-iliac symphysis, and the chin to the left cotyloid cavity. In this position, the right hand is introduced, and the head is carried by it on the iliac fossa of the same side; the feet are brought down to terminate as in the first position of the feet.

Fourth position of the face. Here the forehead corresponds to the left sacro-iliac symphysis, and the chin to the right cotyloid cavity. The left hand being introduced,

places the head on the left iliac fossa, and terminates as in the second position of the feet. (*See Pl. LI. Fig.* 1 *and* 2.)

Before proceeding to the last of the presentations of the head, we must remark, that the first and second positions of the face are the most favorable to apply the lever, which is introduced immediately on the left, or the right side of the pelvis, according to the peculiar position of the head; this instrument being placed directly on the occiput, tends to bring it, as well as the whole head, into the cavity of the pelvis.

F. *Presentation of the auricular region, or of the sides of the head.* The marks common to the two sides of the head are, a hard and rounded tumor, indicating this last part. The presence of the ear, and of the angle of the lower jaw, leave no doubt in regard to the peculiar position of each ear.

First position. Right side. According to our mode of classifying the different positions of the sides of the head, the vertex, in this first position, is considered as corresponding to the base of the left iliac fossa, the face to the sacrum, the posterior or loose edge of the ear to the pubis. The right hand raises the head, carries it on the right iliac fossa, to terminate the labor in the first position of the feet.

First position. Left side. The general position of the head, relative to the superior strait, is the same as in the preceding position. Here, however, the face corresponds to the pubis, and the posterior edge of the ear to the sacrum. The right hand is introduced, raises the head and carries it toward the right iliac fossa: the feet are then brought down, and the labor is terminated as in the preceding position.

Second position. Right side. The top of the head looks to the base of the right iliac fossa, and the face to the pubis.

The left hand is directed towards the occiput, to place it on the left iliac fossa, and goes along the left side of the child to the feet, and the labor is terminated as in the second position of the feet.

Second position. Left side. The face corresponds to the sacrum; otherwise, the child is as in the first position. The left hand will place the occiput on the left iliac fossa, to terminate the labor as in the second position of the feet.

Third position. Right side. The top of the head corresponds to the pubis, and the face to the left side of the pelvis. The right hand being introduced on the left side of the pelvis, embraces the head, and carries it on the right iliac fossa. The feet are then brought down, and the labor terminated in the first position.

Third position. Left side. The child's face looks to the right side of the pelvis, and the summit to the pubis. The left hand is introduced to the right side of the pelvis, displaces the head, pushes it towards the left iliac fossa, brings down the feet, and terminates as in the second position of the feet.

Fourth position. Right side. The top of the head looks to the sacrum, and the face to the right side of the pelvis. The left hand will push back the head, and carry it towards the left iliac fossa, to terminate the labor as in the second position of the feet.

Fourth position. Left side. The top of the head looks to the sacrum, and the face to the left side of the pelvis. The right hand is directed towards the left side of the pelvis, raises the head and carries it towards the right iliac fossa, and terminates as in the first position of the feet. (*See Pl. LII. Fig.* 1 *and* 2.)

We conclude our remarks in regard to the simple manœuvre, which requires no instrument, and can be executed solely by the hand; but the head particularly, sometimes requires a more complex manœuvre. In fact, the head is not unfrequently so wedged in the strait, that it can neither be pushed back into the uterus, nor brought into the cavity without the aid of instruments: hence, the history of the complex or instrumental manœuvre naturally follows.

COMPLEX OR INSTRUMENTAL MANŒUVRE.

When the hand only is required to terminate the labor, the operation is termed the simple manœuvre: it is compound, or even complex, when the accoucheur is obliged to use instruments. Some of these instruments are simply auxiliaries to the hand, and neither injure the parts of the mother, nor those of the child: although they are few, their services to the art, and consequently to humanity, are invaluable. These instruments are the forceps, the lever, the blunt-hook, and the fillet. The simple instrumental manœuvre is performed with them.

The others are more dangerous in their application, and injure in a greater or less degree the parts of the mother, or those of the child. These instruments are, first, those employed in performing the Cesarean operation and symphysiotomy; second, all those which are used in extracting the dead child. (*For a description of these instruments, see the latter end of the book.*)

Use of the forceps. The forceps is applied only to the head of the child. The form of the instrument, and the mechanism of its application, indicate very plainly the

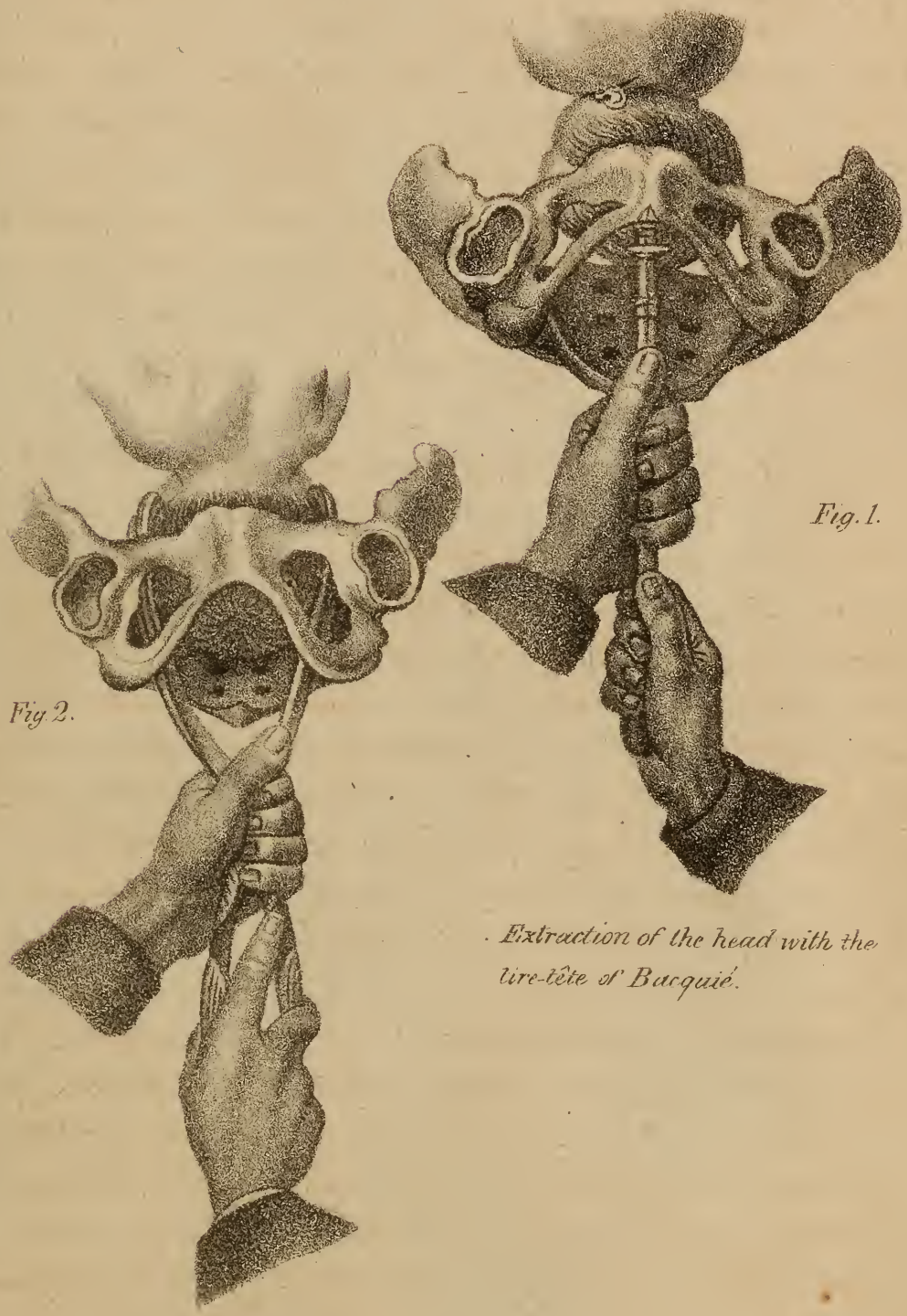


Fig. 1.

Extraction of the head with the tire-tête of Bacquié.

Fig. 2.

Extraction of the child with the crotchet-forceps

Fussio del.

Lithog. of Imbert.

Puncture of the belly
in a case of dropsy.

Fig. 1.

Puncture of the head
in hydrocephalus.

Fig. 2.

Fassio del.

Luthon sc. Imbert

Extraction of the head with the new extractor.

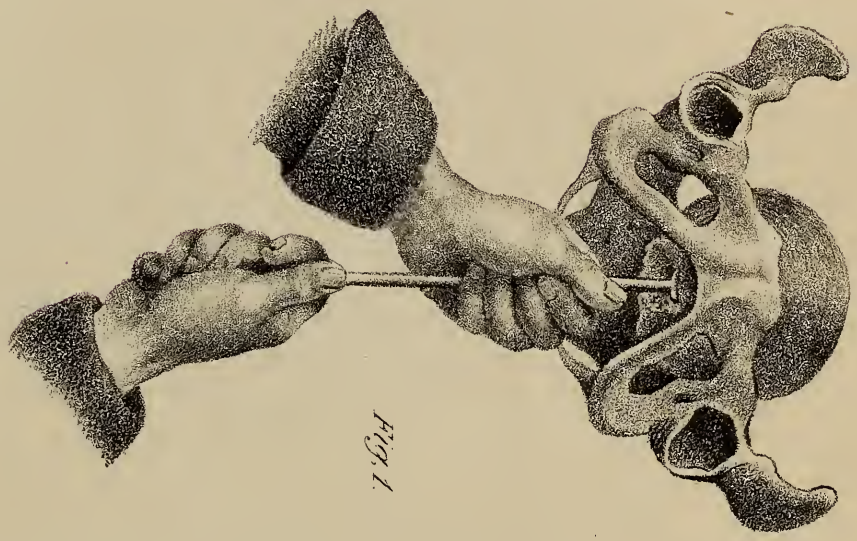


Fig. 1.

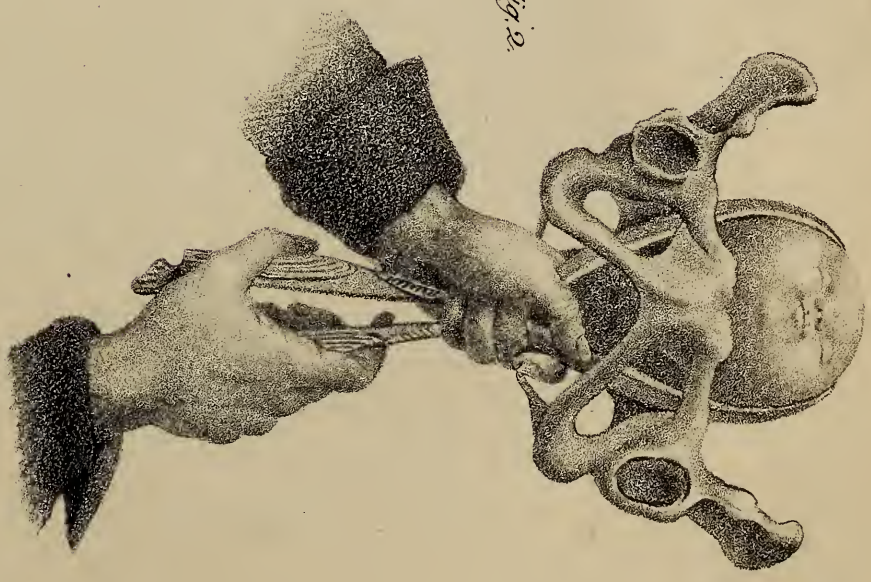


Fig. 2.

Extraction of the head with the Crochet forceps.

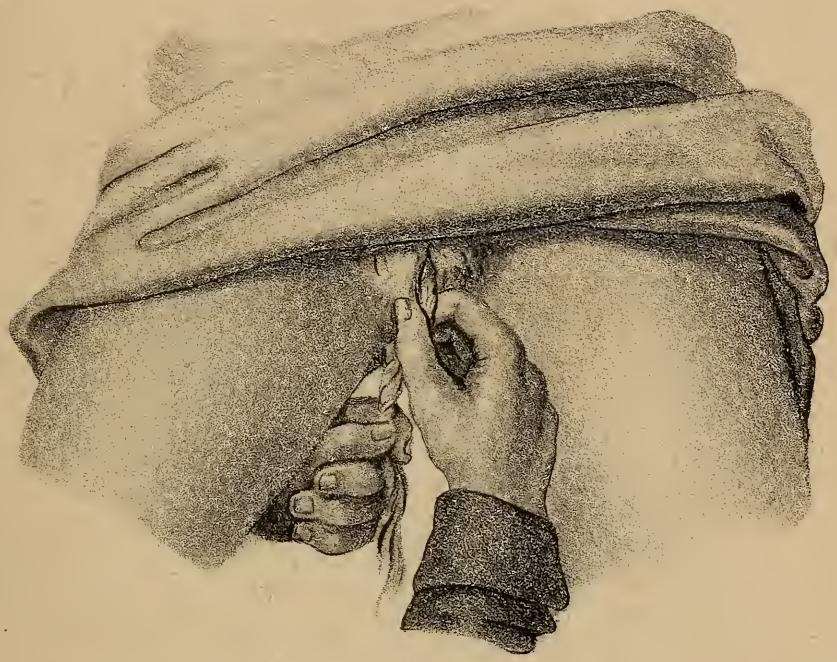


Fig 1. 1st Period.

Fig 2. 2d Period.

Natural Delivery.

J. Bisbee del. & lith. N.Y.

Extraction of the Placenta after the rupture of the Cord.

PL. LXX.

Fig 1.

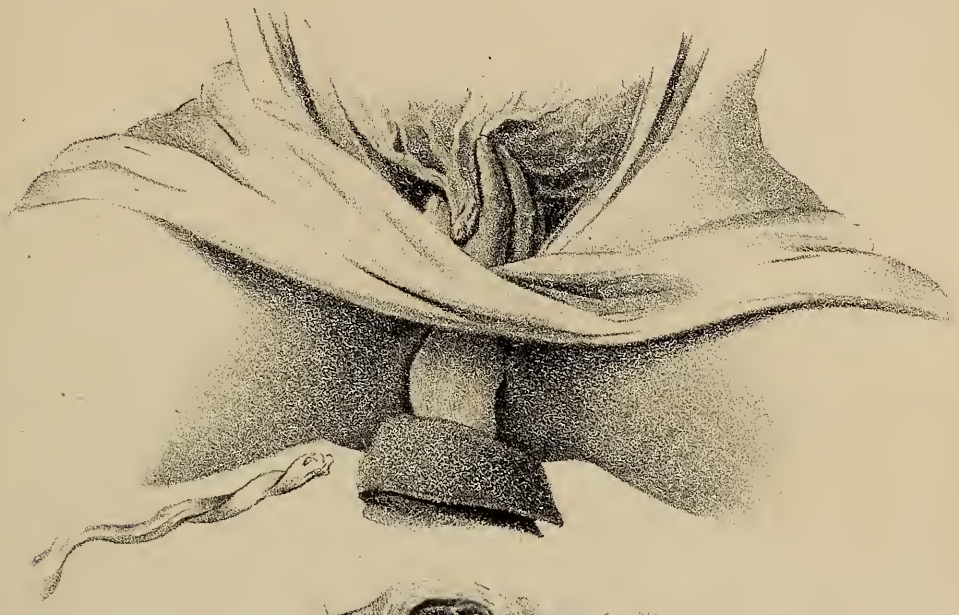


Fig 2.

Extraction of the Placenta with the Abortion forceps.

Lith.d.ª Hessel & Browne.

danger of seizing any other part of the child with it. The causes which require the application of the forceps, are doubtless very numerous; they may, however, be reduced to the following, some of which depend on the mother, others on the child. The first proceed partly from the resistance of the external genital organs, and partly from the greater or less degree of narrowness of the upper or lower strait. The second may generally be ascribed to the bigness of the child's head, and also to the inactivity of the uterus. The forceps may be used on the child's head when it has descended into the cavity, or is retained at the superior strait, whether the trunk is still within the uterus, or has emerged from the external organs of generation. It must be applied only on the sides of the child's head: this precept admits of but one exception, which we shall carefully mention.

A. *Application of the forceps on the head in the cavity, the trunk being in the uterus.* When the head has descended into the cavity, it may have four different positions. In the first case, the occiput looks towards the pubis, and the face to the sacrum; in the second case, the opposite is true; in the third, the occiput is to the left, and the face to the right; in the fourth, it has an opposite position.

Case first. The occiput upward, the face downward. The female being placed properly, and as if for the simple manœuvre, the operator takes with the left hand the male branch of the forceps or that with the pivot, which must previously be soaked in warm water, and oiled: the right hand, which is also greased, is introduced into the genital organs on the left side, so as to place two or three fingers between the neck of the uterus and the head of the child. These precautions being taken, we glide along them the

male blade, which is held by the left hand, and conducted so as to describe a long curve, carrying the extremity just introduced from before backward and from above downward, which cannot be done unless the handle of the blade is at first elevated outward, then depressed as much, and almost perpendicularly between the thighs of the female. (*See Pl. LIII. Fig.* 1.) By this means the blade will be placed flat first on a part of the forehead, and then applied on the left lateral region of the child.

The male blade being thus applied, and kept in place firmly by an assistant, the operator will withdraw the right hand, to grasp the female or mortised blade, and by the aid of the fingers of the left hand, interposed in turn between the inner edge of the right side of the uterus, and the corresponding surface of the head, he will place this second blade like the first.

When the forceps is properly applied, the two blades should be introduced about four or five inches, and the pivot of the male blade at the height and in the direction of the symphysis pubis (*See Pl. LIII. Fig.* 2.); the two blades are crossed on the outside, and united by their pivot on which the key acts; the instrument is closed at first with a moderate degree of force, and afterwards more strongly, so that the extremities of the blades shall touch. The blades being thus in contact, their handles are confined with a ribbon, or with the corner of a towel. The operator, after seizing the instrument with the left hand placed in a state of supination near the vulva, and the right hand in pronation towards its opposite extremity, will pull upon the head at first moderately, and then a little more powerfully, to bring it outward, carrying the instrument first to the right, then to the left, and gradually depressing it to

bring the occiput under the arch of the pubis. The instrument is now raised, the face and the forehead are turned in the cavity of the sacrum, which often distends the perineum very much, and requires the operator to support it strongly with the left hand, while the right will continue to extract the head, gradually raising the body and the blades of the forceps towards the belly of the mother, which will cause the occiput to turn under the arch of the pubis, and will finally deliver it with the rest of the head out of the vulva.

Case second. The occiput downward, and the face upward. Although the situation of the head in this second case is the opposite of the preceding, the forceps, however, are applied in the same manner; that is, the two blades must be introduced and placed precisely as in the first case: the head, however, must be extracted more slowly, because the face forced, like the occiput in the preceding case, to turn under the arch of the pubis, does not perform this motion as well as the latter, on account of its prominences and irregularities.

From this arrangement it follows that the perineum is still more prominent here than in the preceding case, on account of the rounded and very projecting form of the occiput.

Case third. The occiput to the right or left, and the face to the opposite side. Perhaps the head, in descending into the cavity, does not rotate sufficiently to be properly situated in the perineal strait, and it then remains placed on the side, and wedged in between the two tuberosities of the ischium.

It has been thought that when in this position, the forceps was the only remedy: but the mode of applying it in this case differs much from that in the two preceding cases.

Thus supposing that the occiput was to the right and the face to the left, the female blade is seized with the right hand, keeping it flat on the abdomen of the mother, and in the direction of the symphysis pubis, to place it directly in the hollow of the sacrum. In proportion as the blade is introduced, its extremity is directed a little towards the posterior regions of the child's head, and it is kept in that position by an assistant: the male blade is then taken and introduced in the same manner under the symphysis pubis, in order to place it on the opposite side of the child's head, and then the pivot is fitted to the mortise of the female blade. The two blades being tied and kept firmly together, the operator, still retaining his hold on the forceps, will stand on the outside of the left thigh of the mother, in order to perform with the instrument a very extensive circular motion, which places the occiput under the arch of the pubis, while the face looks towards the hollow of the sacrum. The labor is terminated as in the preceding case.

Note. In this violent rotation of the head on its axis, it is exposed to be twisted if we act too quickly, because the trunk does not always follow the motions of the child's head: the skillful operator will foresee, by the resistance he meets with, the dangers to which the child is exposed, and he will act accordingly.

Case fourth. The occiput in the opposite direction. In this unfavorable position of the child's head, the blades must be used as in the preceding case, with this difference, however, that the female blade, which must be applied first, should be introduced under the arch of the pubis, and the male blade, near the hollow of the sacrum. Farther, the long circular motion of the head must be executed as in the preceding case, with this difference, however, that the

operator, in performing it, stands on the outside of the right thigh of the mother.

B. *Application of the forceps on the head at the superior strait, the child being in the uterus.* The head may be arrested at the superior strait, either by the narrowness of this opening, or by the unusual size of the child's head: in both cases there is generally inactivity of the uterus. The application of the forceps is imperiously demanded in these cases, but it should not be used except when the superior strait measures not less than from three to three and a quarter inches from before backward, and the pelvis also must not be too evidently deformed.

The head, when arrested at the superior strait, may be placed there in four different ways, as in the cavity, although with some modifications to be mentioned hereafter.

In the first and second case, we suppose the head placed longitudinally in the direction of the sacro-pubic diameter, with the occiput looking sometimes to the pubis, sometimes to the sacrum. In these first two cases, the forceps must be applied as before, that is, the male blade is grasped with the left hand, and the female with the right; they must be introduced successively, and applied on the sides of the child's head, after placing one hand in the vagina to direct the progress of the instrument. But, considering the great distance of the head, the instrument must be carried much more deeply: without this precaution, its extremity alone will be placed on the head, and upon the least effort the instrument will doubtless slip, and by coming out too quickly would necessarily be liable to expose the parts of the mother to contusions and even to lacerations of greater or less extent.

When the instrument is properly and methodically

applied, we endeavor to bring the head into the cavity, taking care to pull in the direction of the superior strait, and in such a manner that the great diameters of the head are as much as possible in relation with those of the pelvis.

As in the case now treated of, the external organs of generation are not dilated: and as they preserve their natural resistance, it is very important to pull upon the head just when it is about to escape, sustaining the external organs with the utmost care.

When the pelvis is extremely narrow, the head may present on the side, and propelled by violent and continued pains, it may be wedged in between the sacro-vertebral prominence on one side, and the symphysis pubis on the other. In this critical situation the child will inevitably perish, if it be not speedily delivered with the forceps; but as the head is immovable, and as it is impossible to apply the blades of the forceps on its sides, since the parietal protuberances are firmly compressed between the sacrum and the symphysis pubis, the only mode of extracting the head is, to seize it longitudinally, that is, from the face to the occiput, although these uneven parts are very unfavorable by the application of the blades of the forceps, and particularly by keeping them in place. Notwithstanding this inconvenience, when the head is once grasped, the necessary attempts are made to bring it into the cavity, taking every precaution not to crush the face or break the bones of the skull.

As soon as the head has descended into the cavity, we immediately withdraw the blades successively, in order to introduce them again on the sides of the head, as we have mentioned above, and proceed to the final delivery of the child in the same manner.

C. *Application of the forceps on the head, when retained at the superior strait, or even in the cavity, the trunk being delivered.* Experience has proved that in almost every case of delivery by the feet, the child's life is very much endangered, in consequence of the exertions we are often obliged to make on the head to bring it into the cavity, or even to disengage it from the external organs of generation. These considerations have for some time determined practitioners to prefer in these cases the application of the forceps to manual delivery.

As in the simple manœuvre, the child is always brought with the anterior surfaces downward, the forceps are applied in the following manner: the body and the arms of the child are held, and raised towards the abdomen of the mother, and the male blade is introduced on the left side of this latter, and placed on the right side of the child's head. This blade being held by an assistant, the female blade is introduced in like manner on the opposite side. The two blades are brought together and secured; the trunk of the child is then depressed, previously covering the forceps with a towel; the operator then grasps the child and the instrument, acts successively upon each, and brings them both from the genital organs.

In the opposite position, that is, when the face is turned towards the pubis and the occiput to the sacrum, the instrument is applied in the same manner as in the preceding case; but here the child is depressed towards the perineum instead of being raised towards the abdomen of the mother; hence it follows, that the mode of delivery differs slightly, although the labor is terminated in about the same manner as the preceding.

COMPLEX INSTRUMENTAL MANŒUVRE.

Symphysiotomy, or the operation of dividing the symphysis pubis, hysterotomy, or the Cesarean operation, and all the operations performed on the dead child, compose the complex instrumental manœuvre. In fact, the instruments used for these different operations, are more or less detrimental to the mother and child; with this difference, however, that in the first two cases, we have to act upon a living child, and that in the latter the child is dead, and the instruments are used upon it. In this latter case, it is not a labor which must be terminated more or less methodically, it is a foreign body from which the mother must be relieved.

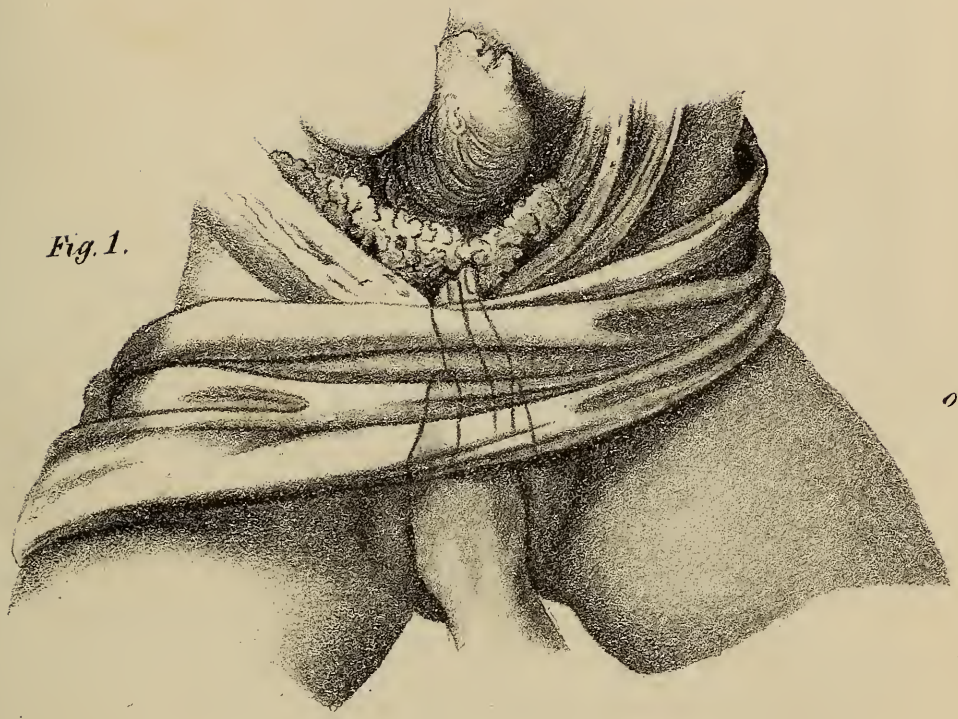
The practitioner must conclude to perform the Cesarean operation and that of symphysiotomy, neither by the antiquity of the operation, nor by the degree of risk to which the mother and child are exposed, but by the narrowness of the pelvis: for if it be true that symphysiotomy appears at first view less dangerous to the mother than the Cesarean operation, it undeniably requires more time, and is much more difficult to perform than this latter.

They are performed in the following manner.

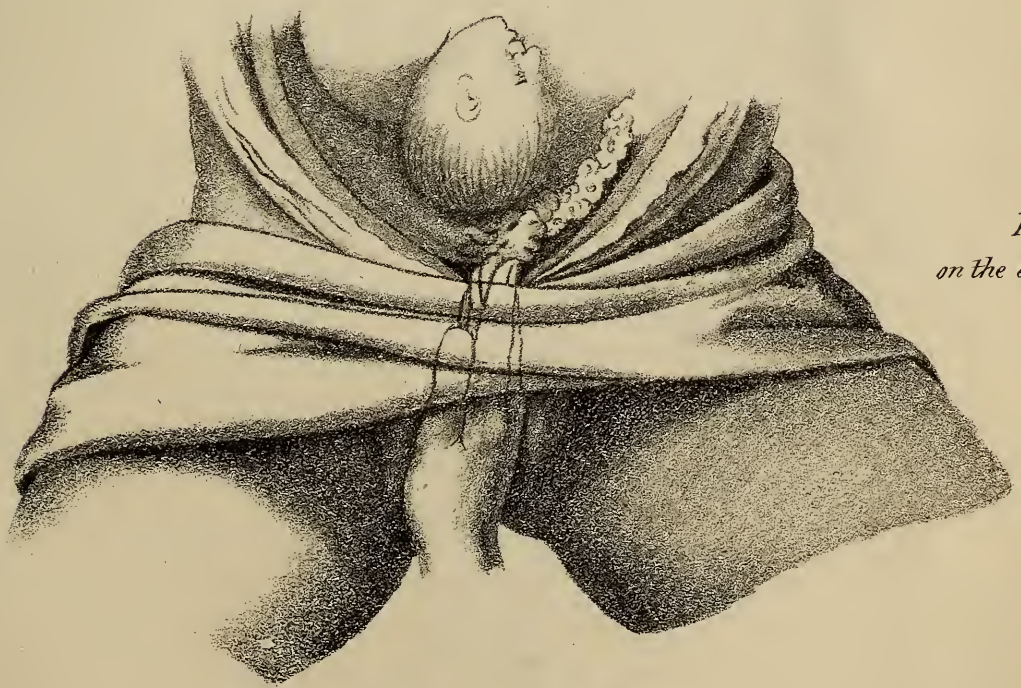
Symphysiotomy. When the pelvis measures less than three inches from before backward, the labor cannot be terminated with the forceps. We must employ other means: two operations may be performed when the child is living, symphysiotomy and hysterotomy. The first of these two operations is proper, when the antero-posterior diameter measures not less than two inches, for when the

PL. LXXI.

Fig. 1.



Placenta
over the Os tincæ.

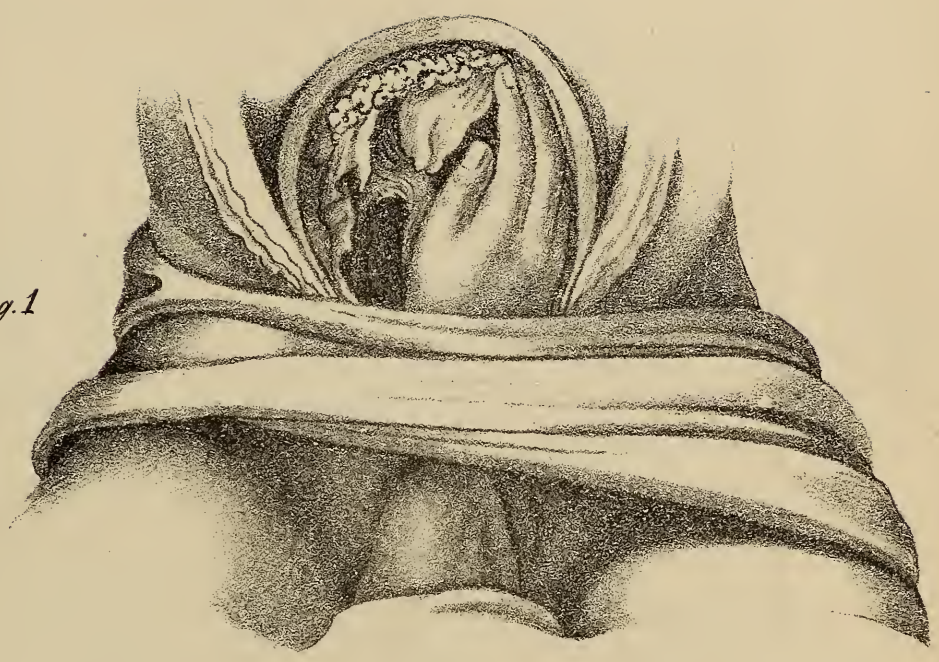


Placenta
on the edges of the Os tinca

Fassio del.

Lithog.ʸ of D.G. Johnson

Fig. 1



Delivery of a
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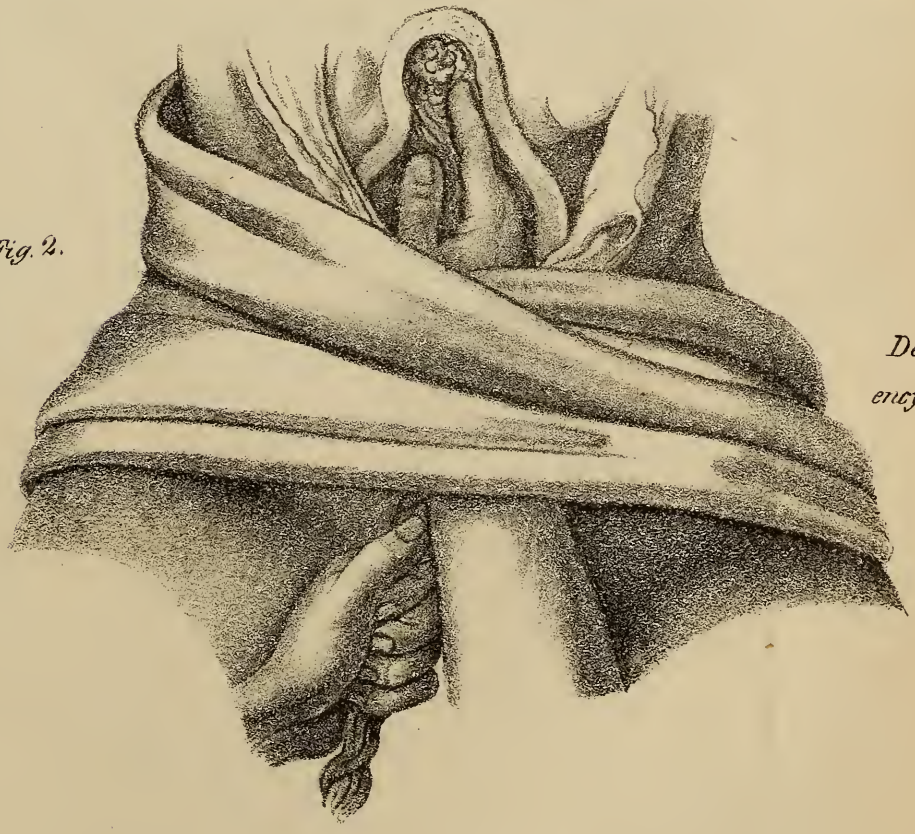
Fig. 2.



Delivery of an
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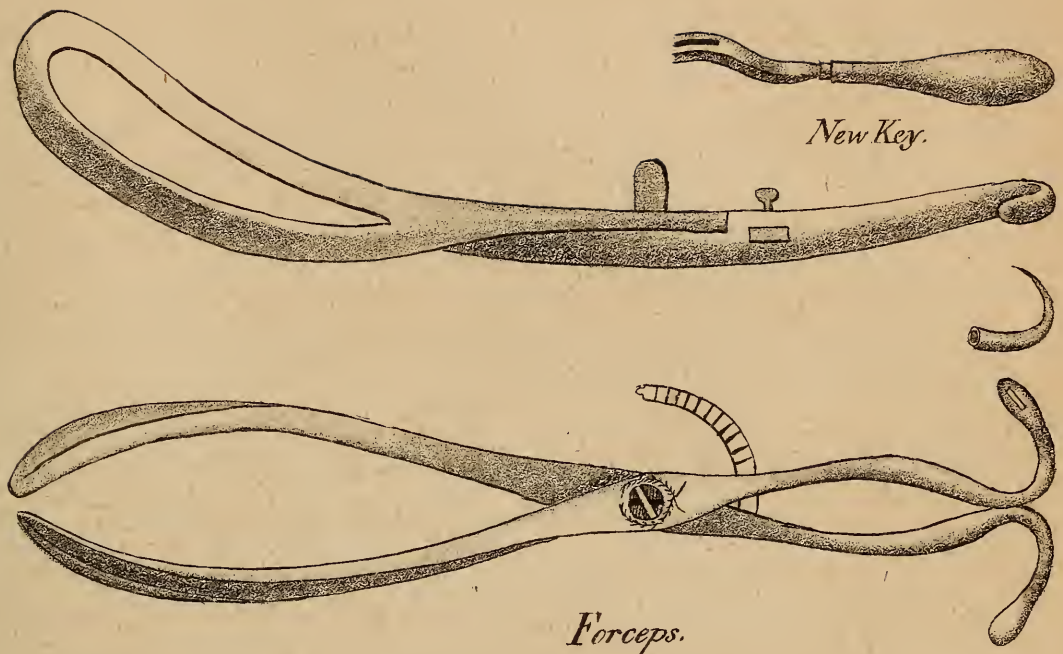
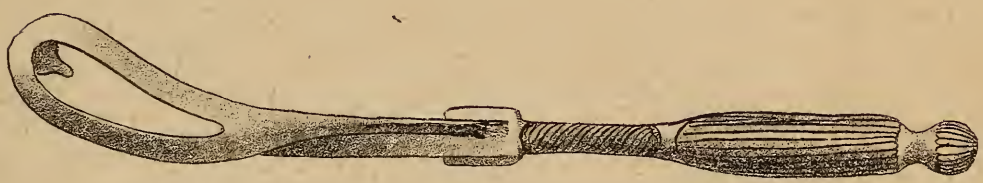
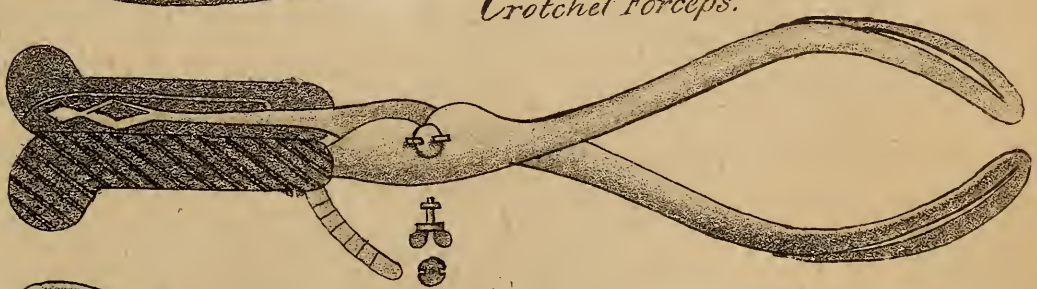


New Key.

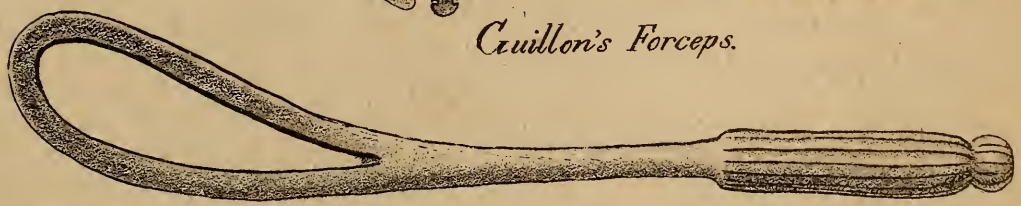
Forceps.



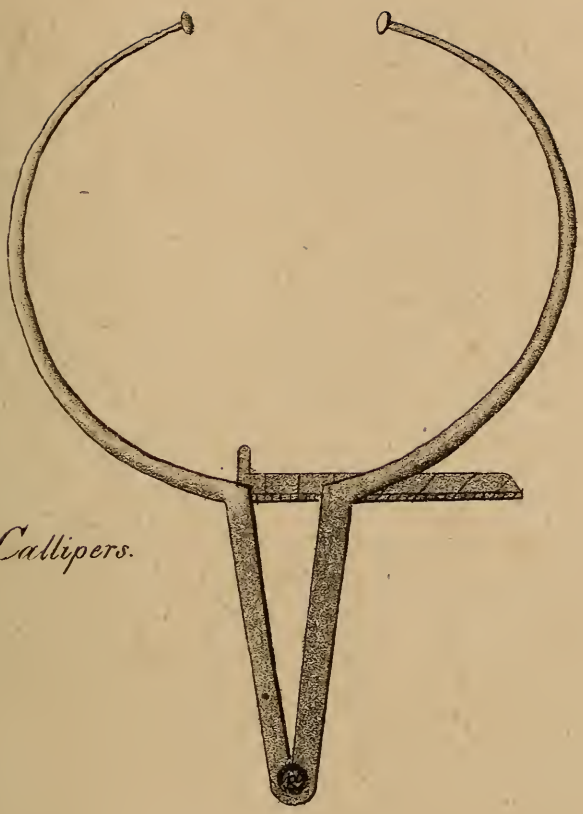
Crotchel Forceps.



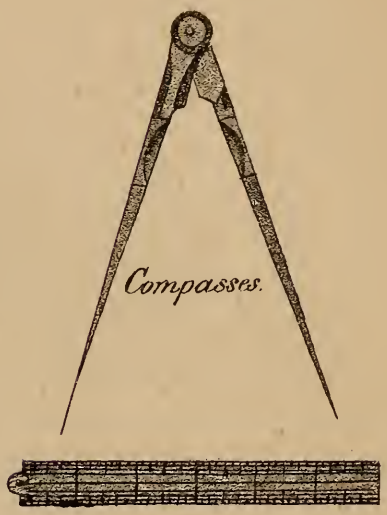
Guillon's Forceps.



Lever.

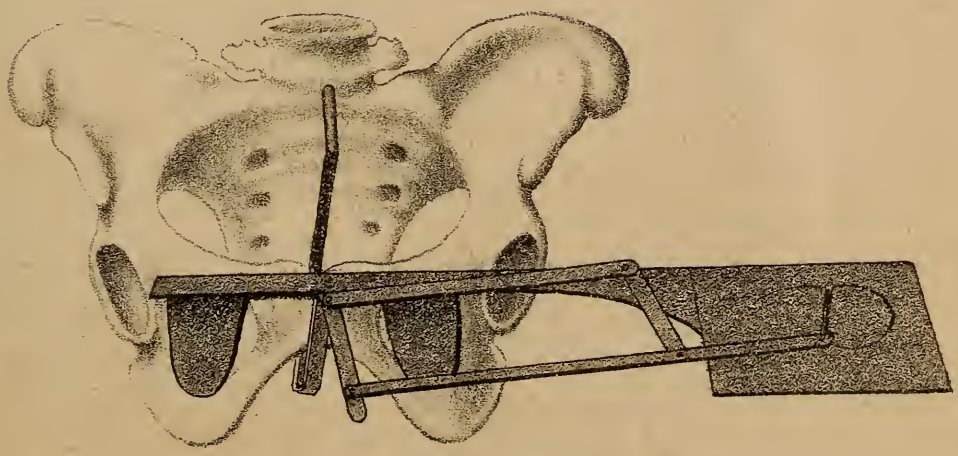


Callipers.

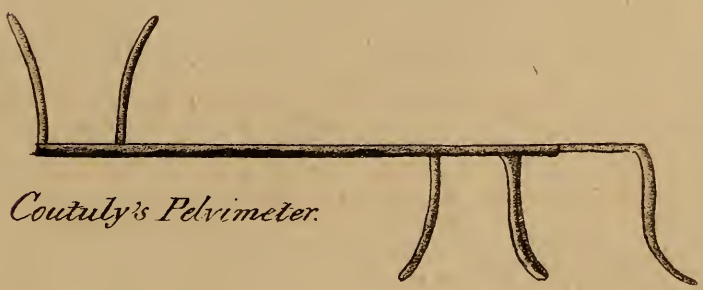


Compasses.

Rule.

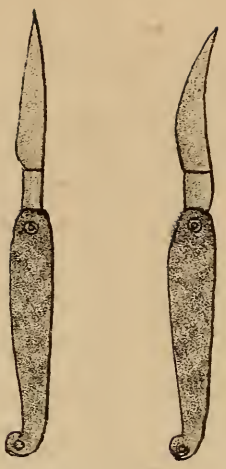


M.r Martin's pelvigraph.



Coutuly's Pelvimeter.

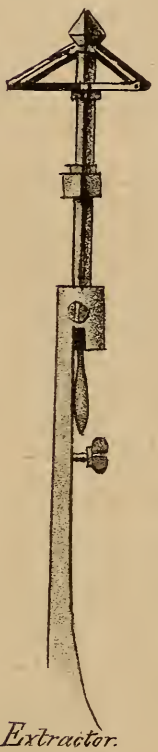
Symphysis knife.



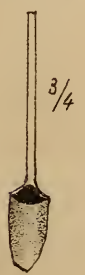
Bistouries.

Scissars.

Perforator.



Extractor.



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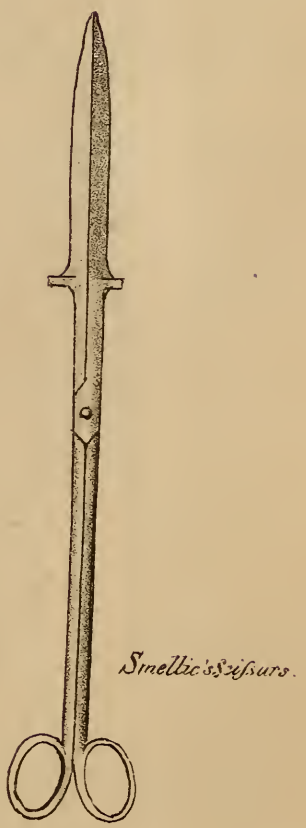
Laryngæal Tube.

New Extractor.



Smellie's Scissurs.

pelvis is less, it cannot, with its small proportions, be sufficiently separated for the head to pass, without serious injury to the mother.

It is not then sufficient, where the antero-posterior diameter is very narrow, to decide upon one of these two operations; we must not employ them without a certainty of success, founded on the known dimensions of the head, and its relations with the diameters of the pelvis. Hence why the Cesarean operation should not be practised, except when the narrowness of the pelvis does not admit of symphysiotomy.

The object of this last operation is to enlarge the pelvis generally, and particularly the superior strait. These results can be obtained only by dividing in its whole length the fibro-cartilage between the two ossa pubis, and afterwards by separating them as much as is thought necessary, to allow the head to pass freely through the pelvis.

The practitioner must take into view all these considerations, before performing either of these two operations.

In both cases, the first thing is to place the female in a proper position: in symphysiotomy, she must lie on the edge of the bed, her legs flexed and separated, with the pelvis slightly elevated. Two assistants, standing on the right and left, support the legs and separate them very much, when the inter-pubic cartilage is divided: two other assistants are also in attendance, either to separate the lips of the external incision, or to assist in separating the thighs.

The mons veneris must be shaved, and the bladder must be emptied by a catheter, which must remain there, in order to carry the urethra to the right or left during the operation, and to prevent it from being wounded.

The operator stands between the legs of the female, with a common bistoury in his right hand, and at two or three incisions divides the skin and cellular tissue, carrying the instrument in the direction of the symphysis pubis. The fibro-cartilage being exposed, he then uses the *symphysis knife*, with which the symphysis is divided, taking care not to hurry, and supporting the instrument firmly on the fibro-cartilage. (*See Pl. LVII. Fig.* 1.)

In proportion as the fibro-cartilage is divided, the thighs of the female are separated, in order to facilitate the rest of the operation; but the last strokes of the bistoury should be made with care, for fear of wounding the bladder. Perhaps it would be better to divide the last layers of the fibro-cartilage, by separating the thighs, rather than with the knife.

The operator must direct and order the necessary degree of separation, which should be made slowly, gradually and constantly. When the requisite degree of separation is attained, the practitioner must terminate the labor immediately, either by bringing down the feet, if he thinks proper, or by applying the forceps to the head. If this latter seems to be engaged easily, the labor may be left to the contractions of the uterus.

But in this operation, the labor rarely terminates spontaneously, and it would even be dangerous to leave it to nature alone: it is infinitely more prudent for the mother and child, to deliver as promptly as possible, in the manner mentioned above.

The labor being terminated, we must instantly bring the thighs together, put the separated ossa pubis in contact, and attend to the dressing, which is performed by applying straps of adhesive plaster, in order that the parts may heal

by the first intention, if possible. The whole is sustained by a bandage applied methodically, and sufficiently tight to keep the parts directly in contact, and as it were immovable.

The delivery of the placenta, in symphysiotomy, does not differ from that generally practised in the most common cases of natural labor, when no bad symptoms present. Thus the thighs being approximated directly after the operation, we wait until the contraction of the uterus allows us to attend to the delivery of the placenta, which must be performed with unusual care, on account of the suffering state of the female. She must remain perfectly still for a very long time, and not attempt to move until the divided parts are perfectly cicatrized.

Such is a brief description of symphysiotomy: we shall now present a few remarks on the operation.

Authors generally admit that as soon as the fibro-cartilage is divided, the divided parts separate spontaneously to a greater or less extent, which effect results from the peculiar action of the bones, which tend, say they, to separate quickly when they are not in contact. This is an error which is demonstrated both by anatomical knowledge, and by practical facts; to be satisfied of which, we have merely to divide the symphysis pubis in a female cadaver whose thighs are simply separated: there will not merely be no spontaneous separation, but if the instrument with which the section was made be left to itself, it will remain in the divided parts, from the contraction caused by the fibro-cartilage, the swelling of which is then very manifest.

If a separation, falsely termed spontaneous, sometimes occurs when the fibro-cartilage is divided, it must be ascribed to the pulling of the assistants, and not to a special

action of the bones of the pelvis, an action inconsistent with reason, and unsanctioned by the peculiar laws of the motions of the bones of the pelvis.

When it is determined to perform the operation of symphysiotomy, we must not be content to arrange every thing for its success, we must also calculate beforehand to what extent the bones of the pubis must be separated to permit the head to pass freely. Now we know that one inch of separation enlarges the sacro-pubic diameter about two lines; and two inches, four lines, &c.: but the separation must never be more than two inches, and it must be remembered, that with this degree of separation, one part of the head is engaged across, which increases in a relative degree the sacro-pubic diameter. (*See Pl. LVIII. Fig.* 1)

We cannot, however, be too attentive to the fact that the increase of two lines for every inch of separation does not occur in every pelvis; in fact, it takes place only in those which, although malformed from before backward, are rounded and well-formed forward. The difference in this respect is very great in a pelvis in which the symphysis is flattened and all the anterior part is nearly even.

In the first case, in fact, the bones, in separating, always proceed more and more forward, and in the second, on the contrary, they are only removed to the right and left, without sensibly increasing the extent of the sacro-pubic diameter. (*See Pl. LX. Fig.* 1 *and* 2.)

In performing symphysiotomy, the division of the fibro-cartilage is not always the most difficult part of the operation. The practitioner is more frequently embarrassed by the manner in which the labor terminates: we proceed to lay down a few general principles on this subject.

After dividing the inter-pubic fibro-cartilage, when the

head is loosely engaged within the pelvis, and every thing indicates a prompt and easy delivery, its termination must be favored by all possible means, by preserving the degree of separation necessary for the head to pass, and encouraging the female to sustain her pains, and to bear down: but if we suspect the labor will terminate slowly, either from the size of the head, the feebleness of the contractions of the uterus, or from the want of courage in the mother, it is better to bring down the feet or apply the forceps, if the child's head be too closely engaged to think of turning. When it is decided to bring down the feet, and to turn the child as it is commonly called, we must not extract the head by the simple manœuvre; to attempt it, would be imprudent, on account of the difficulty and danger in keeping the bones separated long enough to bring the head into the cavity by the hands alone. It is better in this case to use the forceps, applying them as soon as the head has come to the strait. (*See Pl. LIX. Fig.* 2.)

It is important to the success of the operation, and to the prevention of bad consequences to the female, to take peculiar care of her first attempts at motion. It is very difficult to fix the exact period when she can begin to walk: that depends much on the good state of the parts, the cicatrization of the external wound, and the perfect union of the fibro-cartilage. In all these cases, it is better for the female to be confined to her bed a little longer, than to expose herself to accidents by getting up too soon.

Finally, when there is no further cause for fear, we begin by placing the woman on her knees, supporting her under the arms. The next day, or a few days afterwards, she can put her feet to the ground, but she should not attempt to walk, and she should still be supported as before. In this

manner, we may form some opinion of the degree of solidity in the parts, and supposing it to be perfect, she may then attempt to take a few steps. She should commence drawing one foot after another, and she must not walk as usual, until she is able to stand firmly.

But there is still a difference between walking in the chamber and in the street. In the former, in fact, the alternate motions of the legs are made without any shaking; in the last, on the contrary, the progression is uneven, and one is not always able to conquer its inconveniences: for this reason, the female must not leave her apartment, until she has long been accustomed to walking in her chamber, although it may be very difficult, whatever may be the precautions taken to avoid a little limping, and even an incontinence of urine, which are however but trifling inconveniences for so serious an operation.

Hysterotomy, or the Cesarean Operation. Among the modes employed for terminating unnatural labors, the Cesarean operation, which is now to be described, holds a separate place. We do not allude to the dangers of the operation, as symphysiotomy may sometimes be as serious; we wish to be understood only that as a mode of termination, the Cesarean operation totally differs from the other resources of the art, since it cannot be used except where the fetus cannot be born through the pelvis.

Like all other severe operations, like all extreme means, the Cesarean operation has experienced many vicissitudes. At one time employed without measure, then abandoned and even proscribed on account of its dangers, it is now considered in its proper light, as a violent, and doubtless a very dangerous operation, but as the last and only resource of art to save the lives of mother and child. Employed with

discernment, and when the female can support its formidable dangers, it may be perfectly successful, and then becomes the most brilliant triumph of art over powerless nature.

This operation should be practised only when the antero-posterior diameter of the pelvis is less than two and a half inches, which measurement is very rare, and should give confidence to those who are terrified at this operation; but since it is asserted that in cases of the Cesarean operation, the child cannot be delivered through the pelvis, some other passage must be provided for it. This end can be attained in three modes: the process of the ancients, that of Beaudeloque, and that of Lauvergeat.

Of these three processes, the first is that most generally employed, and yet it is not the least inconvenient, as we shall show hereafter. Let us first describe the operation.

The female being placed on the edge of her bed, and slightly inclined towards the side opposite the operator, the latter holding a common bistoury with a spring blade, makes a longitudinal incision from seven to eight inches in length, in the direction of the rectus muscle, and one inch from its outer edge, so that the lower angle of the wound is three or four fingers' breadth above the pubic region. This precaution is necessary in order that the instrument in its progress may not wound the membranous part of the abdominal muscles.

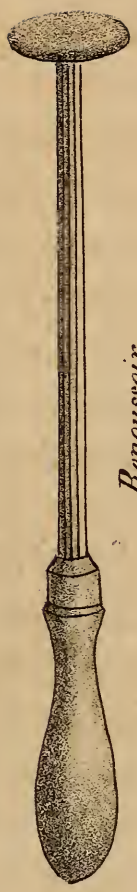
As soon as the integuments are divided, some portions of the intestine may project through the external wound; they must immediately be very carefully replaced, since if injured severe symptoms may follow. In order to avoid this accident, it has been recommended to introduce a probe-pointed bistoury, in one or the other direction, raising the

integuments with the instrument, the blade of which is then directed from within outward.

When the integuments are divided and the edges of the wound are slightly separated, the body of the uterus appears, which can be recognized by its globular form, and its shining and glistening appearance. We must instantly open it by an incision from above downward, in the direction of that of the integuments, and four fingers' breadth in extent, large enough, of course, to extract the child. This incision should be made so that its lower angle comes at or near the centre of the incision in the integuments. (*See Pl. LXI. Fig.* 1.) The operator then introduces one hand within the uterus, seeks for the child's feet, which he grasps and delivers with celerity and prudence. (*See Pl. LXII.*) Although the child is extracted through the soft parts, which oppose its delivery but slightly, it is not strictly necessary to proceed as methodically and with the same precautions as when the labor is terminated in the usual manner. Much caution however must be used. We must always remember that this severe operation has been performed to save the child, and that, with all our care, its life is endangered by weakness.

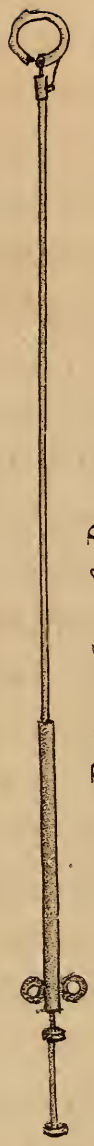
After the child is delivered, the thing most important to the success of the operation is the delivery of the placenta, which may be accomplished in two modes; either through the incision, or through the natural passages. The first mode demands no directions: in fact, we have only to remove the placenta through the external wound, by the aid of the cord, and to deliver it without any other precaution than that required by its passage through the wound in the uterus. But to obtain this result, the placenta must be completely detached after the delivery of the child: for if

Sound.

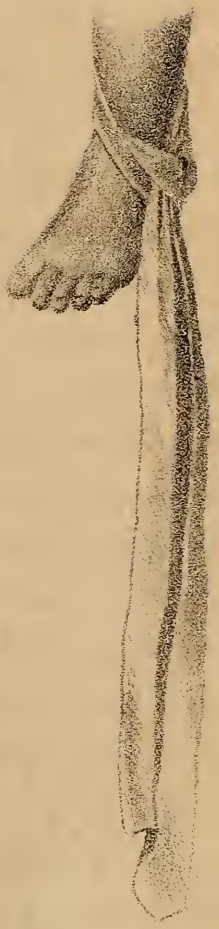


Repoussoir

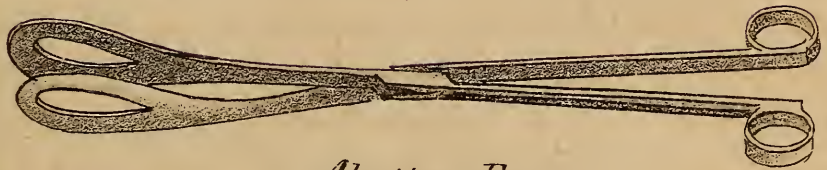
Caullon's Porte-cordon.



Porte-cordon of Ducamp.



Application of the Fillet.



Abortion Forceps.

Common Sound.

Nursing.

E. Bisbee del. & lith. N. Y.

Fig 1.

Fig.4.

Portion of the Areola.

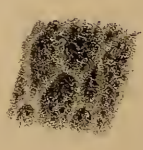
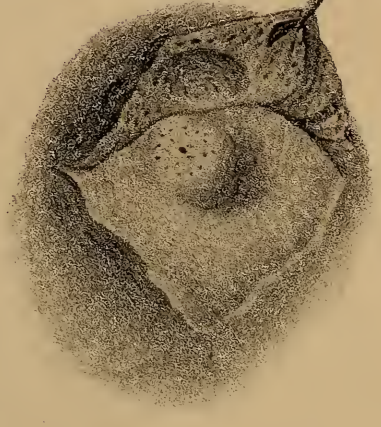


Fig.3.



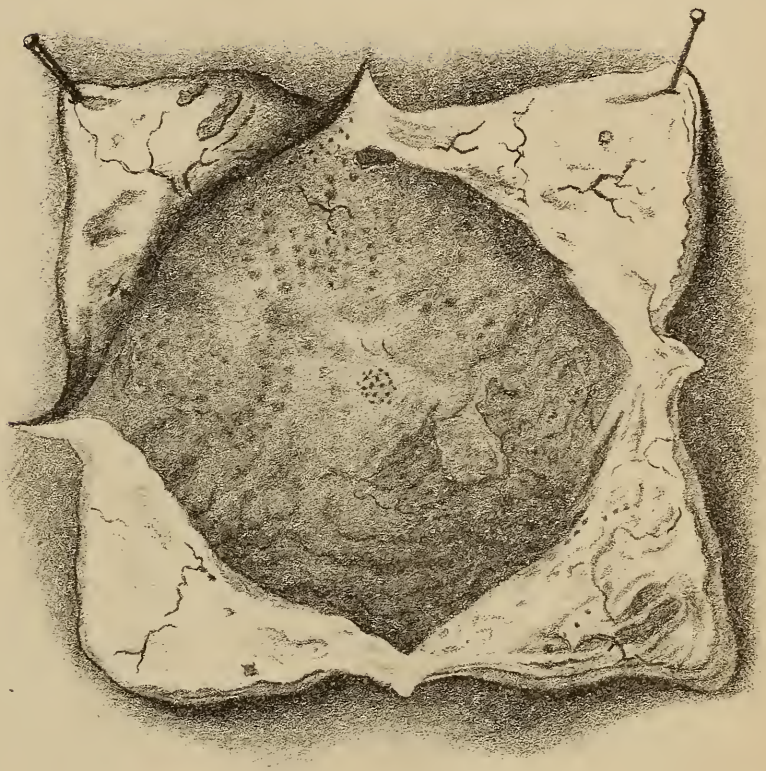
g.2.

papilla of a nursing female.

Areola

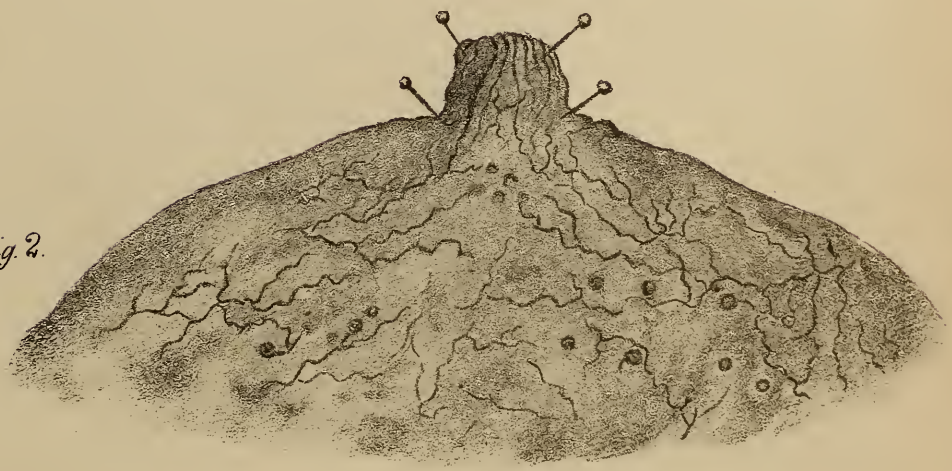
E. Bisbee del. & sc.

Fig. 1.



Mammary Gland exposed.

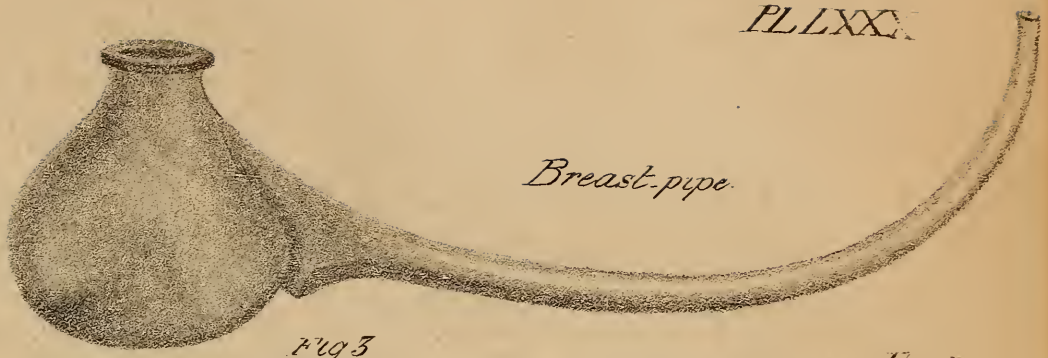
Fig. 2.



Disease of the blood & milk vessels.

PL LXXX.

Fig 1



Breast-pipe.

Fig 3

Wax nipple shields.

Fig 2

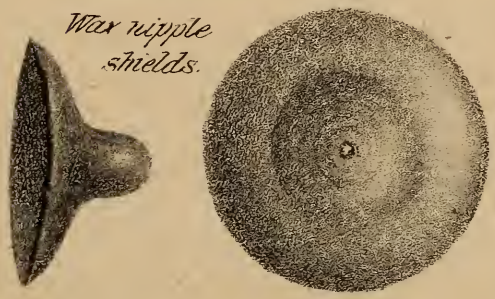


Fig 4
Gum elastic nipple shields

Fig 5.

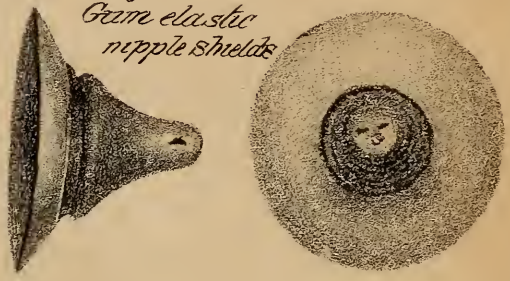
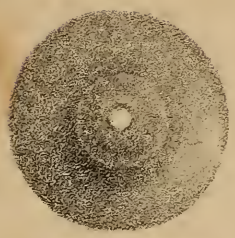


Fig 6.
Box wood nipple shields.

Fig 7.



Nipple-glass.

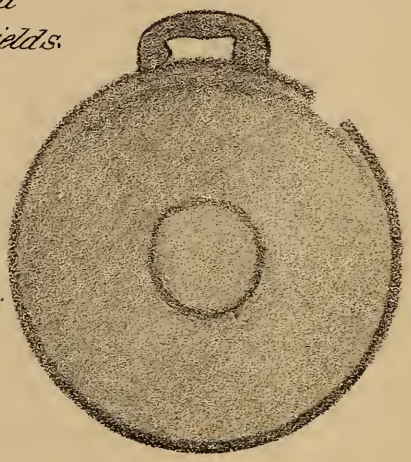
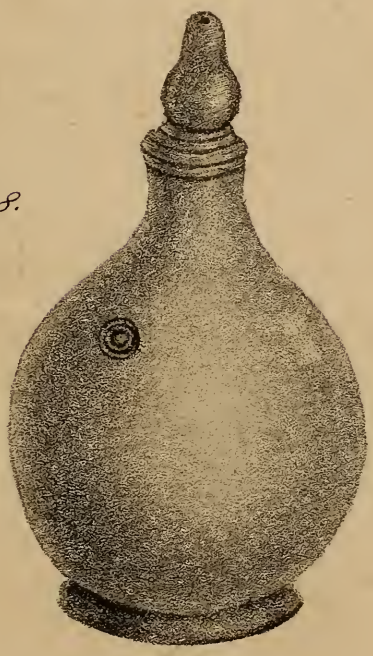
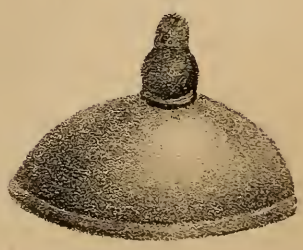


Fig 8.



Biberon of M.me Lebreton.

Fig 9.



Artificial nipple.

Fig 10

Cirdometer.

E. Busbee del & lith. N.Y.

the least force is required, it is infinitely better to leave it within the uterus, and to wait until the uterine contractions bring it down towards the neck, and to extract from the natural passages. This last process is highly advantageous, as it favors the flow of the fluids towards the vagina, and thus turns them from the wound in the uterus, through which it is always dangerous for them to pass.

But if the umbilical cord be left in the uterus after the child is delivered, it can pass through the neck but rarely, and as in this case we must wait until the whole placenta has come there, before we can deliver it, it is recommended immediately after the child is expelled, and the cord divided, to introduce its cut extremity into the tube of a long gum-elastic sound, the opposite extremity of which is directed through the wound in the uterus, towards the inner opening of the os tincæ: in this manner, the cord is brought through the vagina out of the external organs of generation, and then the placenta can be extracted.

Although this mode is ingenious, something was still desirable, since the cord not being attached to the tube of the sound, might easily escape and frustrate this part of the operation. To prevent this inconvenience, we have thought of fitting a movable ring to the extremity of the sound which receives the end of the cord, by which we may tighten the extremity of the sound at pleasure, and thus fix firmly the portion of the cord within it. (*See Pl. LXIII.*)

We ought not to omit mentioning a very serious circumstance which may occur at the moment the uterus is divided. Suppose, in fact, that the placenta is attached to the inner face of the uterus, in that part corresponding to the incision of this organ, we must necessarily make a large wound in it; this might occasion hemorrhage, which

would be more dangerous, because most of the fluid would come into the cavity of the uterus, and some also might be effused into the abdomen.

However serious this accident might be, we must deliver the placenta, and even remove its divided portions through the wound in the uterus, as quickly as possible. This is the only mode of arresting the hemorrhage, and of preventing the danger which might attend the mother from the more or less prolonged continuance of the portions of the placenta in the uterus.

When the delivery of the placenta is happily terminated, the female must immediately be put to bed, in a slightly bent position, and the most perfect rest must be enjoined.

Some practitioners have proposed to apply sutures to the edges of the wound of the integuments, to keep them in contact, and to favor the formation of a cicatrix: but we prefer simply strips of adhesive plaster. Some compresses placed gently on the wound, and a loose body bandage complete the dressing. In fact, if the operation be successful, the uterus in contracting soon effaces the incision made to remove the child: the cicatrization of the external wound not being prevented, the female may be perfectly well in a few days.

Such is the ancient mode of performing the Cesarean operation: it is generally employed, even by the moderns, but its severe inconveniences have induced practitioners to substitute others for it. In fact, it is evident that in this mode of performing the operation, the abdominal muscles are divided in different directions, and the transversalis abdominis muscle is not cut across, which might retard the cicatrization of the external wound. Farther, in perform-

ing the operation in this manner, we cannot always avoid the epigastric artery, and some of its large branches, and even the uterine artery and the appendages of the uterus. The placenta too, which is often inserted in the sides of this organ, may also be interested in a greater or less extent, and thus give rise to the most alarming hemorrhages. Finally, the place in which the operation is performed, may not always be large enough, on account of the deformity of the person operated upon, which is sometimes very great. Such are the inconveniences, we might almost say the accidents, which attend the Cesarean operation performed after the manner of the ancients, which have led practitioners to make the incision of the abdomen along the linea alba. This mode of operating is termed Beaudeloque's mode.

Beaudeloque's Mode. The division of the abdominal muscles in the Cesarean operation, has always been considered by practitioners as a serious circumstance. Violent inflammations, the length of time necessary to the cicatrization, and the dread every moment of seeing portions of the intestine escape externally, are in fact very common consequences.

The last considerations led Beaudeloque to propose to make the incision in the abdomen along the linea alba. In this mode of operating, the fleshy part of the abdominal muscles is not concerned; we also avoid all the other inconveniences mentioned above, but it also presents remarkable disadvantages which we shall mention after describing the operation.

In this process, the parietes of the abdomen are divided along the linea alba, and the incision is equal in extent to that made on the side in the former mode. This incision commences at two or three fingers' breadth above the um-

bilicus, which must be avoided, passing on the side of it, and terminates three fingers' breadths above the pubis. In this manner nearly all the linea alba is divided, and exposes the uterus, in which an incision is made, perfectly like that mentioned in the former mode. The other steps of the operation are exactly like those mentioned above: we shall not repeat them here.

This process, as we have described it, is doubtless more simple than the preceding, since all the inconveniences mentioned in the operation, as performed by the ancients, are avoided; but it presents some others which we must mention, such as the length of the cicatrix, and the extreme difficulty of its healing: this exposes females to hernias, which are more difficult to reduce and to prevent, because the parietes of the abdomen present no resistance to their formation; on the other hand, if females who have been operated upon become pregnant again, they are exposed to new hernias which may be extremely large, and also to all the bad symptoms which they cause.

We have now to say one word of Lauvergeat's mode, which, like the preceding, presents some advantages and disadvantages: but this differs very much in respect to the place and direction of the external incision.

Lauvergeat's Operation. This scientific practitioner, struck with the great inconveniences attending the longitudinal division of the fibres of the transversalis muscle, and with the difficulty resulting from it in the cicatrization of the external wound after the Cesarean operation as performed by the ancients, proposed to make a transverse instead of a longitudinal incision of the abdominal muscles. In this mode of operating, in fact, the fibres of the transversalis muscle are scarcely touched; they are separated,

rather than divided: and if the operation be successful, the cicatrization of the external wound, favored by the flexed position of the patient, is very easy.

But this mode, on the other hand, presents so great disadvantages, that it has been nearly abandoned by practitioners, who generally prefer one of the two preceding processes. It is, in fact, remarkable for this, that when the operation performed in this manner is to be successful, it must perhaps be rejected: for then the incision of the uterus being suddenly brought below that of the integuments, by the quick contraction of this organ, one part of the lochiæ must inevitably escape into the belly, and cause there serious accidents. (*See Pl. LXIV.*)

It follows, from these remarks, that of the three modes of performing hysterotomy, the operation of the ancients is most inconvenient, although perhaps it is more easily practised; and it is also advantageous as allowing an easy issue to the lochiæ, which sometimes escape through the wound in the uterus: so that Beaudeloque's mode seems preferable to the other two, although the only one which is attended with such fatal consequences: we allude to the difficulty of cicatrization, and the inevitable formation of hernias. As to Lauvergeat's mode, its advantages do not compensate for the inconveniences which often attend it, and we think it should never be performed.

M. Beaudeloque, jun. has recently proposed a new process which deserves the attention of practitioners. Our limits prevent us from stating it.*

* The following account of M. Beaudeloque's jun. mode of performing the Cesarean operation, is from *Dr. Meigs' translation of Velpeau's Midwifery.*

" The incision is commenced near the spine of the pubis, and extends, parallel to Poupart's ligament, beyond the antero-superior spine of the ilium. He

OPERATIONS PERFORMED ON THE DEAD CHILD.

Before treating of the different operations performed upon the dead child, we shall mention the signs by which its death may be proved. It may have been dead for several days, or it may have died during labor. In the first case, the child is generally in a more or less advanced state of decomposition, according to the nature of the causes which have destroyed it. In the second case, on the contrary, it is always uninjured, and of the strength and size of a full grown child. The causes of its death, in the first case, are very various, and their peculiar nature cannot always be determined. This is not true in the second case, in which the length of the labor, the power and energy of the uterine contractions, may be considered as the only and real causes of the child's death.

The following phenomena are usually observed in the first case: the female, who has hitherto felt distinctly the motions of her child, perceives that they grow more and

selects the left side, on account of the inclination of the cervix, when the womb is oblique to the right, and the right side where there is a left lateral obliquity. After having divided the abdominal parietes without touching the epigastric artery, he pushes away the peritoneum from the iliac fossa, quite down into the excavation, and detaches it from the upper part of the vagina, which he opens; through this opening, which ought to be sufficiently free, the finger is conducted into the os uteri, which is now to be drawn up towards the wound in the abdomen, while the fundus is at the same time pressed in an opposite direction, so as to make it turn over more readily. When the operator has succeeded in bringing the orifice of the womb opposite to the opening made in the abdominal parietes, the delivery is intrusted to the uterine contractions, or provided it should be absolutely necessary, the orifice might be dilated with the fingers, and the fetus extracted either with the hand or the forceps."

more feeble, and they finally cease. The belly then becomes flaccid, and as it were undulating: the female perceives an inconvenient weight, and a kind of ball which rolls about in her belly, and which is always felt on the side toward which she inclines. The mammæ collapse, and are flaccid: the head becomes embarrassed: the eyes are moist and suffused, and often surrounded with a bluish circle: the nose becomes sharper, the lips lose their color, and there is a general paleness of the whole face: the mouth becomes thick, and has a bitter taste: the appetite is lost, and the digestion is deranged: the urine is muddy and thick: a colliquative sweat frequently appears: the female seems sad and watchful, and the sleep is often interrupted by harrassing dreams: sometimes a more or less marked jaundice is seen on some separate parts of her body.

Finally, in such cases, the membranes are frequently ruptured without the knowledge of the female, and the cord is wasted, soft, pulseless, and then escapes, either into the vagina or through the external organs of generation, accompanied with the discharge of a greater or less quantity of water, which is sometimes clear, sometimes turbid, yellowish, &c. If we now examine the female by touching, we feel the soft flexible head, and the bones of the skull lap over each other easily.

It is more difficult to determine when the child dies during labor, because then the death is not sudden, but on the contrary very gradual, since the female still thinks its motions are perceptible long after life is extinct. The accoucheur, however, may be satisfied of the child's death when, during a severe labor, the pains instead of becoming stronger and more intense, are on the contrary more feeble, when the female loses her strength and courage; when the belly

evidently collapses; when the hairy scalp of the fetus, which was hard, tumefied, and resisting, becomes soft and flaccid, and glides over the surfaces of the bones as if detached from them.

Such are the different signs by which we can determine the death of the child, either during labor, or long before its commencement. Let us now mention the different operations to remove the child, in both cases.

I. When the head presents, and all the common modes employed to bring it into the cavity of the pelvis have failed, either on account of its volume, or from the narrowness of the pelvis, we must decide upon opening the skull, and removing most of the cerebral mass. This operation is termed *encephalotomy.* The manner of performing it is as follows: the female being placed in a proper position, a perforator is introduced, by which a part of the hairy scalp is divided in the direction of a suture, or at one of the fontanelles. This first incision finished, the instrument is withdrawn, and Smellie's scissors are substituted, which are introduced deeply into the skull. They are then separated, and extended in every direction, enlarging the opening through which most of the cerebral mass is removed. (*See Pl. LXV. Fig.* 1 *and* 2.)

Although the head, thus diminished by the removal of the brain, may easily pass through the pelvis, the child is rarely left to the natural efforts of the uterus: on account of the bad symptoms which might follow, the labor must not be intrusted to the efforts of nature; and it is more prudent to terminate it by art.

In this case, however, we must not use the common forceps to extract the child; for the head being necessarily smaller and less resisting, the instrument may slip, and

injure or even tear more or less deeply the parts of the mother.

Among the means indicated in this case, we may use first any extractor by which we may perhaps bring down the head. (*See Pl. LXVI. Fig.* 1.) But in this operation, the bones of the child's skull, already partially broken, may possibly yield too easily to the action of the instrument, and frustrate the operation: hence some practitioners prefer to apply a sharp crotchet, which is introduced at first very deeply within the uterus, and then on withdrawing it, we attempt to fix it on the child's head, and thus remove the child.

But however advantageous this process may be, we cannot conceal its dangers: in fact, in the very violent efforts sometimes necessary to remove the child, the crotchet is liable to tear into folds the part of the head to which it is applied, and by coming forth quickly and unexpectedly, to lacerate the parts of the mother deeply.

The crotchet-forceps, improved by us upon that of Smellie, seems preferable in every respect. It is applied like the common forceps; and with this instrument we may pull violently upon the child's head without fear of its slipping; and suppose even that it should give way, the parts of the mother are never exposed, for the crotchets are placed within the blades, and can in no manner tear or bruise her. (*See Pl. LXVI. Fig.* 2.)

II. When the child has died from some of the causes of debility already mentioned, and it has begun to decompose, there is commonly a more or less abundant discharge, either in the head or in the abdominal cavity; they then become very large, when all the other parts of the child are on the contrary very small, and as it were wasted.

Those parts likewise, which are brought towards the opening of the pelvis by their weight, are also those which are generally found near the upper strait, through which they are too large to pass. The indication in both cases is simple: we may even premise that labors of this kind are extremely easy, as soon as the obstacle which opposed their termination is removed; which is done by evacuating the effused fluid through an opening made with any sharp instrument.

Thus when the belly presents, and after satisfying ourselves of its existence, we introduce with proper precautions a trocar. (*See Pl. LXVII. Fig.* 1.) The effused fluid immediately escapes, and the parts collapse instantly: we may then bring down the feet, and terminate the labor without difficulty.

But if the child be affected with hydrocephalus, and the head is much larger than the opening of the pelvis, through which however it must escape, we must remove the effused fluid, either by perforating the parts with the trocar, or with one of the extractors mentioned above. The operation in this case presents no difficulty: we have only to carry the point of the instrument through the enlarged opening of any suture, and thus to penetrate deeply into the skull of the child, and a great quantity of fluid will be discharged. The skull collapses, and the labor soon terminates.

The same course must be pursued if the feet are brought down, and the head, arrested at the superior strait, should be prevented from coming farther. Perhaps it is not so easy, in this case, to place the end of the instrument just in the interval of a suture; but the bones of the skull

resist but slightly, and we easily penetrate within it, and evacuate the fluid. (*See Pl. LXVII. Fig.* 2.)

III. Sometimes an imprudent person, by pulling violently on the child's feet to deliver it, may separate the trunk from the head, which is left within the uterus. This is a serious case, as the attendants are terrified, and it is difficult to seize and extract the head.

If the head, when thus separated, remains movable within the uterus, it will not always be prudent to deliver it immediately by art. The action of the uterus alone, by placing it favorably across the strait, sometimes expels it; but this is very rare, and as the head has been separated from the trunk by violent efforts, it follows that it is most generally fixed and even partly engaged through the superior strait, the occipital foramen looking towards the external organs of generation. This last circumstance is fortunate, inasmuch as we can easily introduce any extractor into the child's skull, and we can thus bring it into the cavity and consequently out of the vulva: but all the extractors, and even that figured by us (*See Pl. LXVIII. Fig.* 1.), are very inconvenient in their application, as they engage and remove the bones of the child's skull, by the force sometimes required to extract the head; and when this occurs it cannot be remedied, and this mode must be renounced. We do not therefore recommend the use of the extractor unless we are almost certain of removing the head, without being obliged to make too great efforts, or when we are in want of the necessary instruments to supply it.

In a similar case, and for the same reasons, it has been recommended to use a small stick, an inch and a half long, to the centre of which is attached a cord, long enough and strong enough to fulfill the object proposed. The stick is

introduced lengthwise into the skull, through the occipital foramen: it places itself crosswise: we then draw upon it to remove the head: but this mode, like the preceding, can be accomplished only when the occipital foramen has the proper direction: in the contrary case, being perfectly useless, we must employ the crotchet. At first a single crotchet is used, which is introduced without any other precaution than that of applying it in some part of the child's head. But we have already mentioned the great inconveniences of applying a simple crotchet, and to avoid them, we advise the use of our forceps with a double crotchet, which secures the mother from all accident, and presents advantages offered by no other. The head being seized properly, is delivered without difficulty, whatever may be the resistance. (*See Pl. LXVIII. Fig.* 2.)

OF DELIVERY.

The term delivery is applied to that part of the labor in which the placenta, the membranes, and the umbilical cord are expelled or extracted. The delivery is divided into natural and artificial.

Natural delivery. In natural delivery we have to consider it as occurring at the end of pregnancy, before this time, and in the case of compound pregnancy.

A. *Natural delivery at the full period.* In every natural delivery occurring at the end of pregnancy, whether simple or compound, there are two very distinct periods. The first is that during which the uterus by its successive and constantly increasing contractions, is finally more or less detached from the placenta, which is then loose, and as it

were floating within this organ at the moment when the child is born. The second period is, according to most writers, the proper delivery; during which the accoucheur removes the placenta and the membranes from the genital organs, using that part of the umbilical cord delivered with the child.

The first period of natural delivery occurs without our aid; the second requires it. The following is the manner of proceeding.

Soon after the child is born, the female is perfectly quiet, except that she is a little disturbed by the fear of new pains which may be occasioned by the delivery: this latter is in fact generally attended by rather severe colics, which indicate that the uterus in contracting, attempts to expel the placenta and its membranes.

In order to excite these pains, when they are not spontaneous, the abdomen must be rubbed. This simple and easy thing is generally sufficient to renew the action of the uterus, which can be felt in this case as high as the umbilical region: at this time also, we must draw the cord gently, in order to deliver the placenta.

To accomplish this, the index finger of the left hand takes several turns of the cord, while the index finger of the right hand glides along the cord to the mouth of the uterus, in order to determine the presence of the placenta: we then move the cord in different directions; the placenta is easily brought into the vagina and removed: but before extracting it entirely, it is well to turn it round several times, in order to twist the membranes, which in this case are not so liable to be torn, and consequently to be left in the uterus in greater or less portions, which might occasion several bad symptoms. (*See Pl. LXIX. Fig.* 1 *and* 2.)

Sometimes the secundines are so large that they cannot be delivered, and stop at the orifice: then, while we rub the abdomen in the hypogastric region with one hand, and pull gently on the cord, two other fingers of the opposite hand are introduced to the placenta, which is removed by inserting if necessary one finger into its substance, and using it as a hook.

The same mode of proceeding should be adopted, if the umbilical cord should by any means be ruptured near the body of the placenta. (*See Pl. LXX. Fig.* 1.)

B. *Of the premature delivery.* Premature delivery must be considered in three different points of view: first, during the first three months of pregnancy; second, during the three following months; third, during a part of the last three months.

During the first three months, the delivery must be regulated by general rules. The following is what occurs most generally in abortions at this period, relative to the delivery of the placenta. The same pain frequently expels the fetus, and the small placenta which attends it; sometimes, however, the fetus is expelled separately, and the placenta comes immediately after; but the latter frequently remains several days, a month, and even more. The most prudent mode in these different cases is, to leave all to nature, which sooner or later expels this foreign body.

In the middle three months of pregnancy, the delivery differs a little from what we have mentioned: but as in the course of the fifth, and particularly the sixth month, the fetus has acquired a certain size, and the placenta is much developed, the neck is obliged to open considerably to allow the child to pass: hence it follows, that if in this case the placenta is not delivered immediately after the fetus, we

ought to be as careful as possible, and preserve the small umbilical cord, which is still attached to the placenta, and must be used to extract this latter, when it is completely detached from the inner face of the uterus. In the opposite case, if the neck remained open, we might seize the whole or a part of the placenta, with the abortion forceps: but this must be done with the greatest prudence. (*See Pl. LXXI. Fig.* 2.)

The delivery in the last three months of pregnancy differs so little from what we have mentioned above, when speaking of delivery at the full period, that we think it superfluous to enter into new details on this subject.

C. *Of delivery, in case of compound pregnancy, and at the full period.* The general rules laid down in the case of simple pregnancy and at the full period, apply in great part to the delivery in compound pregnancy: they differ, however, in some respects, which we shall mention.

Although in compound pregnancy children are born successively, it does not follow that each placenta should be delivered after each child: delivery in this case should be at one time, and all the placentas should be removed at once, being careful to pull rather upon the placenta of the child first delivered, and successively on the second, third, &c.; admitting that the pregnancy was with twins, triplets, &c.

Artificial delivery. The circumstances which require an artificial delivery are very numerous. They may however be reduced to the following: first, inactivity of the uterus, attended or preceded by hemorrhage, convulsions, or repeated faintings; second, insertion of the placenta over or on the edges of the os tincæ; third, an encysted state of a

part or of the whole of the placenta ; fourth, its unnatural adhesion.

A. *Unnatural adhesion of the placenta.* Even after the most natural labor, it is often extremely difficult to extract the placenta. Constant frictions of the abdomen, and all the usual means fail to detach the placenta from the inner face of the uterus, with which it continues intimately connected; the uterus, however, has contracted: the female expe-riences no bad symptoms; she is calm and tranquil; but she is not delivered, and the time passes in useless expecta-tion. In this extraordinary case, practitioners advise us to wait: we, however, are not of this opinion: we think that prudence requires an entirely opposite course. When once the child has left the uterus, the placenta is only a foreign body, and its too long continuance in the cavity of the uterus, often causes severe symptoms. For these reasons, the placenta should be removed when it is not detached from the uterus, and the female is not delivered after an hour or two at most. The following is the mode of proceeding.

The female lying down, the umbilical cord is grasped with two or three fingers of the left hand, and the right hand is immediately introduced within the uterus; guided thus by the umbilical cord, it is directed to the place where the placenta is attached. If this spongy mass adheres to all points of the surface of the uterus, we begin to loosen it on the side corresponding to the hand which is introduced: continuing in this manner, we can easily detach it com-pletely, and immediately bring it entire towards the neck, being careful to remove at the same time the membranes, and the clots which may have been formed in the uterus.

Where the placenta is partially detached, when the hand is introduced into the uterus to deliver the female, we must, as it were, continue the separation of the placenta by this floating portion. In this manner the operation will be less difficult for the accoucheur and less fatiguing to the female. (*See Pl. LXXI. Fig.* 1.)

B. *Of delivery, when the uterus is inactive.* The inactivity of the uterus, which supervenes before the female is delivered, is most commonly attended with hemorrhage or repeated faintings. These latter symptoms more particularly require an artificial delivery: as the presence of the placenta in the cavity of the uterus must be considered the material cause of this inactivity, which if not dependent on this cause, is protracted by it. In both cases there is but one reasonable course to pursue, which is to remove the placenta, observing the precautions already mentioned. One advantage, at least, results from this course, viz., that if the inactivity of the uterus continues after the placenta is delivered, we may then employ the means necessary to remove it, which would not always be possible before the delivery.

C. *Of delivery, where the placenta is attached over or on the edges of the os tincæ.* The attachment of the placenta over the orifice of the uterus or on its edges, is one of the most remarkable and also the most fatal case in practical obstetrics. Here the delivery takes place sometimes before the birth of the child. Farther, in the case before us, the delivery is not exactly the most important point, but rather the appearance of the child, whose life is generally in great danger.

When the placenta is attached over the orifice of the uterus, and on account of the continuance of the labor, its

termination cannot be deferred, we cannot reach the child except by passing through the placenta, or rather, as some practitioners have advised, by detaching it circularly by means of several fingers passed between it and the parts near the neck of the uterus: but this course has always appeared to us hazardous and often even impracticable, and therefore we fearlessly pass through the placenta, which is necessarily preforated, in order to arrive at the child. What is there to fear in employing this method? The detachment of the placenta? this is desired: the laceration of the placenta? but the child must be saved, and the mother suffers from the effects of a long continued hemorrhage. When the labor has terminated, we immediately collect the detached parts of the placenta and remove them entirely from the uterus. We must attend to one thing strictly: we must employ promptly the most energetic means for restoring tone to the uterus, for the female dies if its inactivity continues. (*See Pl. LXX. Fig.* 1.)

The case is not so serious, nor the danger as pressing, when the placenta is inserted only on a part of the edges of the os tincæ. The duty of the accoucheur is also very different, as respects the manner of delivery; which must not be effected, in this case, until after the child is born.

If we proceed methodically, and regard the interests of the mother and child, we must separate, during each pain, the placenta from the neck of the uterus, and this manœuvre must be continued until the membranes pass through its opening, and the bag of waters is well formed. This latter must then be ruptured after a severe pain, in order that the head of the child, placed behind, may engage itself in its turn through the neck, and thus form a kind of

natural plug, which will be for the time the surest means of arresting all hemorrhage. (*See Pl. LXX. Fig.* 2.)

D. *Of delivery, where the placenta is encysted.* The placenta can be encysted only in consequence of a partial contraction of the uterus, while the portion to which the placenta is attached remains inactive. The uterus is then as it were divided into two unequal cavities, one of which, that nearer the neck, is powerfully contracted, and the other, which is more remote, is in a state of relaxation. This circumstance is rather frequent in practice, but the consequences of it are rarely dangerous. The indications presented by the delivery in this case, are nearly the same as those of the delivery of the placenta, where there is an unnatural adhesion. Thus, after having uselessly attempted to excite the action of the uterus near the place where the cyst is formed, the hand must be introduced into the uterus, carrying it by the aid of the cord, to the place where the placenta is situated. If, as is more frequently the case, a greater or less portion of the placenta is engaged, and as it were strangled through the kind of neck formed by the contracted portion of the uterus, this loose portion of the placenta must be used to deliver the rest, by pulling gently upon it. If, on the contrary, the whole placenta is so inclosed in the cavity of the uterus, that we cannot take hold of any portion of it in order to delivery, we must by a forced dilatation, penetrate into the pouch which contains the placenta, separate, and deliver it. (*See Pl. LXXI. Fig.* 2.)

E. *Of some other circumstances of artificial delivery.* The operations practised on the child do not require any peculiar directions in regard to the delivery, which most generally occurs in this case as in the most natural labor: the same is true of the operation of symphysiotomy, after which,

the delivery, as in the preceding case, may take place in the most simple and natural manner. Only the Cesarean operation then, in this respect, presents some particular indications, which we have already mentioned.

INSTRUMENTS USED IN OBSTETRICS.

How the times are changed! The practice of obstetrics, which was formerly so complicated in its means, so frightful, particularly from the number of the instruments used by accoucheurs, has undergone, in our days, a very salutary change. Thanks to the lights thrown upon this latter branch of science, by the advance of surgery in general, and particularly of obstetrics, the number of instruments is singularly diminished, and is now confined to those which are the most indispensable.

As we do not intend to describe these instruments in detail, we shall merely define them, stating more particularly our opinion of their real mechanism, and their advantages.

PLATE LXXIII.

Forceps. Of all the instruments which have been introduced into the science of obstetrics, the forceps has been most remarkably and most happily successful: its invention forms a memorable epoch in the records of the art, and the services it has since rendered prove its excellence, and the necessity of its employment.

The forceps is too complicated for us to give a detailed

description; it is composed of two blades which are crossed and attached by a movable pivot and mortise.

A well made and well proportioned forceps should be from seventeen to eighteen inches long; the joint should not be exactly in the centre of the instrument, but about an inch nearer the extremity of the handles. This extremity should be curved in the form of a blunt crotchet.

If the handles are of wood, (*Dubois forceps*) the thickness of the steel portion to which they are attached, is of little importance: if the contrary be true, the handles should be sufficiently strong and thick, to give support during their application. The blades are well arched, and well rounded, and must present an oval, the large extremity of which should be towards the point of the instrument, and the small towards the joint. Its greatest breadth is situated between the anterior and the two posterior thirds, and should be two and a half inches. These dimensions must be particularly regarded.

The forceps should be made of steel, and not of iron: when formed of the latter material, it is heavy, and gets out of shape: when of steel, on the contrary, it is lighter, gives, and does not get out of shape. In that generally used by us, the key has a new form. This hinge acts circularly, and not from above downward, as in other forceps.

Lever. This instrument was invented by Roonhuisen, who has overrated its advantages: it is now, however, valued as it should be, and is employed only in some rare cases, where the head being placed in an unfavorable position in respect to the superior strait, requires only a slight movement to cause it to pass down.

It is particularly necessary to employ it, when the hand

alone cannot cause the head to perform the motions required by its bad position.

The lever is, in fact, only one blade of the forceps, the curve of which is much less marked, and has none on the side like this latter. It always has a wooden handle. Our remarks on the construction of the forceps are applicable to the lever also.

Forceps of Dr. Guillon. This instrument differs from the preceding, not in its mode of action, but in the form of the joint. It has neither pivot nor mortise; and the mechanism of its union, which is very simple, removes all difficulties which so often attend the union of the blades of the common forceps. The handles also contain several compartments, in which are different objects, useful either in applying the forceps, or in some other operations of practical obstetrics.

Crotchet forceps. The first idea of this instrument belongs to Smellie, but we have made several important alterations in it. Its form is exactly like that of the common forceps; but it differs in respect to the mode of uniting the blades, as also by the two crotchets which are curved inward, and in which the blades terminate, and which are designed particularly to be applied to the head of a dead child, in every case where its delivery is prevented.

PLATE LXXIV.

Callipers and pelvimeter. The callipers, and also the pelvimeter of Coutuly, are much overvalued, and are rarely employed in common practice. Should we not express an opinion in regard to the result of their application we

must admit that their mechanism is very ingenious, and that they fulfill perfectly the conditions proposed by their inventors.

The callipers especially have a great advantage over the pelvimeter, as they may be applied to the external parts of the female, while this latter, introduced into the vagina, must pass entirely through it.

This is the great defect of all instruments of this kind. We shall not except the *pelvigraphe* of M. Martin, which, although complicated in its mechanism, and even difficult in its application, is still a very ingenious, and an entirely new invention.

It is, in fact, arranged so that while one moveable arm, introduced into the vagina, describes the circumference of the pelvis, another arm, placed in the form of a point on a small plate arranged for this purpose, traces perfectly the exact figure of the pelvis, passed over by the arm which is introduced.

The common compasses and the rule, are placed on the same plate, merely to show them.

PLATE LXXV.

Symphysis knife. This is not a new instrument, but simply a common bistoury, to which we have thought proper to give a particular form, and more proper for the kind of operation to which it is designed. The blade is short, probe pointed, with a broad back, and a long strong and square handle. We must observe that the fibro-cartilage of the symphysis pubis is very firm, and it is difficult to cut with a bistoury which has a thin and narrow blade. If the

operator supports it feebly, the fibro-cartilage is not cut; he bears upon it more firmly, the blade of the bistoury breaks, and may wound the female. With the symphysis knife, as made by us, this double inconvenience need not be feared.

The two bistouries, and the two pairs of scissors, placed on the same line as the symphysis knife, present nothing particular, and are there merely to show them.

Perforator. Under this term is designated any sharp instrument, by which we penetrate into the skull of the dead fetus, to remove the mass of the cerebrum. There are several kinds of them, as the common perforator, that of Bacque, and the scissors of Smellie.

The common perforator, (*perce crâne*) is composed of a long iron arm, terminated by a spear point, and has a solid, round handle, four or five inches long. The whole instrument ought not to be less than from sixteen to eighteen inches in length.

The perforator of Bacqué, which is also termed an *extractor* (*tire tête*) is much more complex than the preceding, and is used both for a perforator and an extractor: it is composed of a blade attached to a handle, on which glides at pleasure a second moveable arm: this is terminated by a sharp extremity, on which rest two pieces which are perfectly adapted to this blade when it acts as a perforator, and which are extended on the sides when the instrument is used as an extractor.

Nevertheless, whatever may be the advantages of this instrument, we prefer in the latter case our crotchet forceps.

Smellie's scissors act very differently from the preceding: they may, it is true, serve for a perforator: but when once introduced, we can enlarge at pleasure the opening made by

them, by moving their extremities, the cutting edge of which is outward.

The new extractor which we have drawn, is limited in its employment, and is destined to be introduced through the occipital foramen within the head of the fetus, when this latter has been detruncated, and this opening has a proper direction to allow of its introduction. The arm at the top may be fitted at pleasure to the common blade, when we wish to introduce it, and afterwards placed across, by the aid of a movement of the base; all which is easily performed by a piece of silk, arranged for this purpose.

This instrument is very simple in its mechanism, and is designed to replace the small rod advised by Beaudeloque: a mode, however, which should not be neglected in the cases where it is necessary to use it.

PLATE LXXVI.

Sound for delivery. This is to be used only in the Cesarean operation, when we decide to bring the extremity of the divided cord through the wound of the uterus within this organ, in order to deliver it by the natural passages.

The sound should be from fifteen to eighteen inches long, with one blunt extremity; the opposite extremity open, broad, and cleft at its circumference: a movable ring is designed to close the sound, and to fix firmly the end of the cord inserted in it. The sound must necessarily be introduced by the blunt extremity, carried towards the neck in order to glide it into the vagina, where it must be grasped in order to deliver it, and with it the portion of the cord attached to it.

Repoussoir. This instrument, the uses of which we were the first to indicate, is not for this reason a new instrument: it is rather a new idea, perhaps, applied to an instrument already known, and employed for a new purpose. It is, in fact, designed particularly to act on the head, to push it backward, while on the other hand the practitioner pulls on the feet to bring them outward.

This instrument is composed of a handle from eight to ten inches long, surmounted at one end by a cross-piece which is covered with chamois leather, which protects the head from the painful pressure of the naked wood or ivory.

Porte cordon. Of the two instruments figured with this name, one belongs to Ducamp; the other was invented by Dr. Guillon, who kindly gave us the drawing of it.

It seems that Ducamp took the first idea of his porte cordon from the English. Although its mechanism is rather complicated, the idea is extremely happy, and the instrument is perfectly fitted for the end proposed in its application.

The porte cordon of Dr. Guillon, is very like the preceding, but differs from it in the form of the ring, which opens in two parts only, and which being more simple in its mechanism, is preferable to that of Ducamp.

Abortion forceps of Levret. This forceps does not differ from other instruments of this character, except in the form of the blades, which are grooved, and not plain. Its length should be from twelve to fifteen inches, in order to introduce it sometimes very deeply.

The small foot of a child seen on this plate, gives an idea of the mode in which fillets should be applied.

OF LACTATION.

No sooner is the product of conception delivered, than the functions of the genital organs immediately cease; but the lively irritation which attended them during pregnancy is not entirely removed: another system of organs intimately connected with those of generation, then becomes the seat, and as it were the rendezvous of all nature's efforts, who is particularly attentive to the preservation of the child.

In order to this, a sweet, saccharine, and very nutritious fluid is deposited in the mammæ, which easily escapes from the canals which contain it, and which is discharged abundantly by the least suction of the child, or the least titillation. These phenomena constitute lactation.

Description of the mammæ. The mammæ are developed but slightly in young females, but increase rapidly about the age of puberty; they then rise, become semi-spherical, separate from each other, and assume a firmness and consistence, which disappears in those females who have borne children, and who have nursed.

The skin which covers them is white, tender, and soft; from the centre rises a prolonged prominence, called the nipple, which is surrounded by an areola: both of these are of a delicate red in girls, and a brownish color in females. (*See Pl. LXXVIII. Fig.* 2.)

The mammæ are composed of the mammary gland, the milk passages, the nipple, and the areola.

The mammary gland occupies the centre of the mamma; it is surrounded and, as it were, imbedded in a mass of

fatty cellular tissue, one portion of which enters and even engages itself in its proper tissue.

The gland is of a grayish red color, its consistence is firm, and its form is globular. The vessels which pass through it are very minute, and are extremely difficult to inject. (*See Pl. LXXIX. Fig.* 1 *and* 2.)

The nipple appears as an elongated rounded body, covered with a corrugated and cracked skin, of a more or less deep red color in those females who have borne children, and surrounded at its base by a circle of the same color, termed the *areola :* this latter is covered by an epidermoid surface of the same nature as that which envelops the nipple.

Maceration easily detaches this particular kind of epidermis, which in fact is only a superfluous portion of the real epidermis of these parts. (*See Pl. LXXVIII. Fig.* 3 *and* 4.)

If we divide the mamma of a female recently confined, or who is nursing, through the centre of the nipple, and separate the divided portions, we may observe with a glass, the direction, number, and form, of the milk canals, which are fifteen in number. They are very broad in the body of the gland, and sensibly diminish in proportion as they are directed towards the nipple where they terminate : we can easily squeeze out some drops of milk from them. (*See Pl. LXXIX. Fig.* 2.)

Nursing may be divided into natural and artificial. We term natural nursing, that which is strictly according to the purpose of nature : it supposes on the part of the child, the direct application of its mouth to some nipple, whence it derives its nourishment by the particular act of sucking. Artificial nursing is a mode or particular manner of replacing natural nursing, and of transmitting to the child,

by artificial means, the food proper to nourish it at the moment of birth.

Natural nursing. Of this we distinguish three species: nursing by the mother, by a stranger, and by some animals.

Nursing by the mother conforms most to the purpose of nature: it needs no precept on the part of medicine, and no study on the part of the child: the mother merely presents her bosom, and the child immediately grasps it, and instantly a copious flow of milk follows which is sufficient for its nourishment. We know not which is most surprising among the phenomena of natural nursing, the precision and exactness with which every thing is co-ordained in order that this function may be unimpeded, or, the agreement and kind of sympathy between the mother and child, so that one always wishes what the other ardently desires.

Nursing by a stranger, is, properly speaking, mercenary nursing. In this latter case, she who nurses the child is not its own mother, but a stranger. This mode of nursing is very inconvenient, only, in respect to the bad choice of nurses.

The most general rules to be observed in this respect are,

A good nurse must be from twenty to thirty years old: dark, rather than light, and should present all the appearances of perfect health, be of a lively character, have a good appetite, digest well: her eye should be animated, her teeth white, her gums firm, her color rosy, her lips red, and her breath sweet.

Her bosom demands particular attention.

The mammæ of a good nurse should be swelled by the milk which fills them, and separated by a well marked interval: they should be elongated, and in the form of a

bottle: pendent, and inclined slightly outward. Bluish striæ are easily seen through the light tissue of the skin which covers them.

The nipple should be elongated, a little swelled, and its surface covered with a slight moisture, when the child ceases to suck. The milk should run easily from the mouths of the milk ducts. (*See Pl. LXXVII.*)

The milk itself, examined in drops, on the inclined plane of some vessel, must be pearly white, and transparent; each drop must run slowly, without separating. When carried to the lips, it should leave a slightly saccharine taste, and as the taste disappears, the flavor of a filbert.

When we decide upon giving a newly born child to a hired nurse, it need not suck immediately after birth, as when the child is nursed by the mother: we must, on the contrary, wait until the meconium is discharged, which always requires at least one or two days.

Nursing by the aid of animals is but little used; it should be employed only in those cases where other modes of feeding children are inconvenient. The animals most fit for this purpose are particularly the goat, the sheep, and the ass: the size of the teat of the other large domestic animals, and their indocility, prevent them from being used for this purpose.

Artificial nursing. Artificial nursing is disadvantageous in this respect: being subject to the will, and even the caprice, of the persons intrusted with this mode of raising the little ones, it presents in this respect a thousand inconveniences which natural nursing does not possess.

We ought particularly to be aware of this fact, that artificial nursing, in order to be salutary, should resemble as

much as possible, natural nursing; not only in the qualities of the milk, but also in the time of feeding the child.

There are several modes of artificial nursing. Sometimes a cup is given to the child (*allaitement au petit pot*) which contains its drink. This mode is very inconvenient, and hence the small bottle should be preferred, in the neck of which is a long piece of spunge covered with fine linen. It is thus presented to the child who, deceived by appearances, considers it a nipple.

Mad. Le Breton, midwife at Paris, has recently invented a bottle of a peculiar shape, which seems to combine all these advantages. (*See Pl. LXXX. Fig.* 8.)

INSTRUMENTS FOR NATURAL OR ARTIFICIAL NURSING.

Fig. 1. *Breast-pipe.* This pipe is made of glass, and its design is to enable young females, who wish to nurse their children, to form the nipple, and thus prepare them to be grasped more easily by the child when born. In order to use it, the mouth of the pipe is fitted to the nipple, and then the female puts the bent extremity to her lips, and sucks it, exhausting the air contained in the bottle, and thus forming a vacuum. The nipple is then erected and lengthens: by repeating this several days in succession, this nipple is so prepared that the child sucks it with facility.

Figs. 2. 3. 4. 5. *Nipple shields.* All these instruments have the form of small hats, and are destined for nearly the same uses. Some made of wax, wood, or of gum elastic (*Fig.* 1. 2. 3.), are applied to the nipple, directly after the child has ceased to nurse, to preserve it from the

action of the cold, especially when it has cracked, or to lessen the extreme sensibility, or to preserve it from the friction of the clothing, &c.

The *nipple shields* (*Fig.* 4.) have a tip of gum elastic perforated with several small holes. They may be used where the nipple is excoriated, or has cracked. The head of the nipple to which it is applied, softens the gum elastic and the milk can pass through the holes in it, and thence into the child's mouth.

This mode is difficult, and generally the child is unwilling.

The nipple glasses (*Fig.* 5.), are a kind of flattened bottle, applied to the mammæ of those females who have too much milk: they are left upon the nipples after each nursing, and they are emptied in proportion as they are filled.

There is a small ring on its edge through which a string may be passed, and it can be suspended from the neck of the female.

Figs. 8. 9. *and* 10, are instruments invented by Madame Le Breton.

Fig. 8 is a real bottle, holding from eight to ten ounces, the mouth of which is fashioned in the most convenient manner for the child to suck: this mouth is covered by an artificial nipple (a cow's teat), which the child grasps without difficulty, and from which the milk readily flows.

In order to quicken its flow, and that the child may not exert itself, the bottle presents near its base a small circular opening, through which the external air enters, which acts by its gravity on the liquid, and facilitates the sucking.

Fig. 9 is a peculiar preparation of a cow's teat, which

may be applied on the mouths of all bottles designed for the artificial nursing of the child.

Fig. 10 also is a new instrument, invented by M. Richer, termed a *galometer.* The object of this instrument is to measure the gravity of any milk, and particularly that of the female. It is composed of a small metrical cylinder, terminated like all instruments which measure fluids, by a small hollow ball, which contains a determinate quantity of mercury.

The following is a table of experiments upon the milk of the female, with remarks.

Ages of the females.	Specific gravity of their milk.	REMARKS.
22 to 24 years.	$9\frac{1}{5}$ to 10°	1. The specific gravity of the milk of a female is proportional to her age and not to her constitution.
26 to 28 "	8 to 9	2. If the milk loses its quality in growing old, its specific gravity remains the same.
30 to 32 "	8 hardly	3. The milk of a blond is heavier than that of a dark complexioned person.
34 to 36 "	6 to 7	4. Cow's milk is much lighter than that of the female, and its specific gravity also diminishes in a ratio with the age, and not with the constitution of the cow.
40 to 45 "	4 to 5	

Milk is the special, and may be called the exclusive nourishment of the child during the first year after birth: but as in artificial nursing, we are obliged to supply the milk of the mother by that of others, we have thought proper to form a scale of proportions of all kinds of milk which we can use, indicating them by the strength and richness of their products.

At the head is necessarily placed cow's milk, which is not only the richest in its products, but also the most abundant, and which in this last respect, presents all the resources imaginable. We cannot give it to the child as it

comes from the animal; it is necessary to dilute it in proportion to the strength and age of the child.

When used for artificial nursing, care must be taken that it is always procured from the same cow.

Next comes goat's milk: it is less abundant in nutritious principles than cow's milk; it is nevertheless very advantageous, either as the primary nourishment of the child, or as medicine. In fact, it is used with success in pulmonary affections.

The following is the order in which the other kinds of milk must be placed. First, that of the female; second, of the mare; third, of the ass; fourth, of the sheep.

It follows from this, that for artificial nursing, the milk of cows and goats should be preferred to all others.

FINIS.

RECOMMENDATIONS.

The following recommendations of "Midwifery Illustrated," are submitted to those unacquainted with this book.

DR. DOANE,

Dear Sir,—I learn with great satisfaction, that you are about to submit to the Public a translation of the work of Professor Maygrier on Midwifery. The writings of this distinguished author on Obstetrics, enjoy at the present time the highest reputation in the medical schools of continental Europe; and his graphic illustrations are so simple and so faithful to nature, as to be of incalculable importance both to the student and practitioner. In my professorial lectures on obstetrical science and forensic medicine, I found the demonstrations of Maygrier of signal advantage, and the very moderate price at which your publisher proposes to offer an American edition of this costly performance, cannot fail to secure it an extensive patronage.

JOHN W. FRANCIS, M. D.,
Late Professor of Midwifery and Forensic Medicine in Rutgers College, &c. &c. &c.

The splendid illustrations of Midwifery given in Maygrier's large work, are admirable in their execution, and essentially useful to the practitioner and student. Dr. Doane in making a translation of this work, and giving to the American public an edition of these fine engravings, will essentially serve the cause of medicine, and I do not hesitate to recommend the work.

EDWARD DELAFIELD,
Professor of Obstetrics and Diseases of Women and Children, University of the State of New York.

I am of opinion, that the translation of M. Maygrier's Midwifery, as proposed by Dr. Doane, will be a most valuable acquisition to students and practitioners of medicine.

ALEX. H. STEVENS,
Professor of Surgery, University of New York.

Dr. Doane,

Dear Sir,—I am very happy to learn that you are engaged in translating the invaluable work of J. P. Maygrier, on Midwifery. It is considered in France as one of the best works on the subject of which it treats, and, having attended the lectures of M. Maygrier, I can bear testimony to the great assistance afforded by his excellent plates to those who are anxious to acquire a profound knowledge of obstetric science. The American student has long been in want of such a guide, and there can be no doubt that when presented with this treatise in his own language, he will have the best book for practical purposes now extant. It was my intention to have made an English version of it, but am not disappointed that you have anticipated me.

Respectfully,

G. S. BEDFORD,

Lecturer on Obstetrics, &c. &c. &c. New York.

I possess the large edition of Maygrier's plates, and think them well calculated to aid the comprehension of many manual details in the practice of Midwifery, of which the beginner of this branch of medicine stands much in need.

Wm. P. DEWEES.

Professor of Obstetrics, University of Penn.

I have seen a specimen of the work and plates of Maygrier's Midwifery, translated by Dr. Doane. The specimens of the plates are well executed, and a work of this kind is of great use to the student, and also of advantage to the practitioner in Midwifery. I think such a work deserves the patronage of the medical profession in this country.

THOMAS HUBBARD,

Professor of Surgery, Med. Institution of Yale College.

New Haven, March 13th, 1833.

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